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a quarterly journal of
PLANNING, HOUSING & PUBLIC UTILITIES



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VOLUME XXVII, NUMBER 2

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Contents

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March 1951

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A Program for Economic Stabilization	E. S. Shaw and Lorie Tarshis
Is Price Control Really Necessary?	G. H. Hildebrand and W. Gorter
Credit Control in France	M. A. Kriz
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Secondary Reserve Requirements for Banks	E. C. Simmons
The Distorting Effects of Direct Taxation ...	Eli Schwartz and D. A. Moore
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CONTENTS

MAY 1951

Emergent Urban Problems of Intercity Motor Transportation.....	JEROME D. FELLMANN.....	91
Otto Schiller's "Farming Cooperative:" A Critical Appraisal.....	KARL BRANDT.....	102
An Investigation of Economies of Large Size in Steam Engines.....	JOHN B. LANSING.....	108
II—Welfare Theory, Technological Change and Public Utility		
Investment.....	YALE BROZEN.....	123
Land or People?.....	CHARLES M. HARDIN.....	133
Equity Grounds for Property Taxation Re-examined.....	HAROLD M. GROVES and LOUISE PROBER.....	143
Buying Farms with Hundred Percent Loans: An analysis of the Farm		
Security Administration Loan Experience in Wisconsin.....	W. KEITH BURKETT and KENNETH H. PARSONS.....	151

Reports and Comments

II—A Water Policy for the American People: A Commentary.....	MARTIN G. GLAESER.....	169
Fish Pond Culture for Undeveloped Areas.....	ELI SCHWARTZ.....	172
The Farming Cooperative: A Reply.....	DIMITRI PRONIN.....	178
The Farming Cooperative: A Rejoinder.....	OTTO SCHILLER.....	180
Federal Labor Legislation to Govern Public Utility Strikes.....	ROGER BESSEY.....	182

Book Reviews

<i>Ten Rivers in America's Future</i> Vol. 2 (President's Water Resources Policy Commission).....	HENRY C. HART.....	187
<i>Rural Cuba</i> (Lowry Nelson).....	DAVID WEEKS.....	188
<i>Commercial Motor Transportation</i> (Charles A. Taff).....	LESLIE A. BRYAN.....	189
<i>The Impact of Government on Real Estate Finance in the United States</i>	RICHARD B. ANDREWS.....	190
<i>The Rural Economy of New England, A Regional Study</i> (John D. Black).....	ARTHUR J. WALRATH.....	190
<i>Conservation of Natural Resources</i> (ed. Guy-Harold Smith).....	FRED A. CLARENBACH.....	191
<i>Planning Micronesia's Future</i> (ed. Douglas L. Oliver).....	WILLIAM V. WILMOT, JR.....	192

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VOLUME XXVII
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Emergent Urban Problems of Intercity Motor Transportation†

By JEROME D. FELLMANN*

TO an ever increasing extent in the postwar years, larger metropolitan centers have been forced to turn their attention to the traffic and terminal area congestion problems engendered by intercity common carrier motor freight movement. Initiated and slowly growing during the late 1920s and early 1930s, common carrier highway freight traffic expanded rapidly between 1935, when the industry was rendered more stable by the Interstate Commerce Commission, and the early 1940s, when wartime restrictions limited its normal competitive development. In the years since the close of the war, highway carriers have resumed their prominent position in intercity freight movement and by competing actively and successfully with railroads, particularly in the handling of l.t.l. cargoes for distances up to 500 miles (and frequently beyond), have in-

creased their traffic volumes, have outgrown their terminal facilities, and have multiplied the traffic and land use conflicts they characteristically inflict on congested urban areas.

As the principal origin, destination, and interchange points of common carrier highway freight—and the site of the pickup, delivery, and terminal area activity which this traffic generates—the larger cities have borne the brunt of the new congestion. New terminal construction and the expansion of existing facilities have proceeded apace since 1946 and have been concentrated largely within terminal zones already clogged by heavy truck movement and extensive on-street parking of freight vehicles. In those centers where terminals are grouped in a number of widely-spaced concentrations, uncoordinated freight interchange between individual companies adds to

† The material in this article dealing with the terminal and traffic patterns of Chicago has been abstracted from the author's *Truck Transportation Patterns of Chicago* (University of Chicago, Department of Geography: Research Paper No. 12, 1950). Special gratitude is due to the

Chicago Plan Commission (Harold M. Mayer, formerly Director of Research) and to the Mayor's Committee on Motor Truck Terminals (Harry F. Chaddick, Chairman) for their assistance.

* Department of Geography, University of Illinois.

congestion within each of the separate districts. The adverse effects of highway freight traffic within urban areas are not confined, however, to terminal districts alone but extend to multiple-purpose streets throughout the metropolitan region. Tractor-semitrailer units concentrate their movement between outlying entrance points and centralized terminals along major thoroughfares ill-designed to accommodate the augmenting flow of the ponderous vehicles; similarly, the pickup and delivery operations independently carried on by individual intercity common carrier companies ramify to every commercial and many residential streets and interfere with normal city traffic movement, particularly within central business districts.

Intercity Trucking Patterns of Chicago

The terminal and truck traffic patterns of Chicago, one of the leading highway freight centers of the nation, supply a vivid demonstration of these problems within one major metropolitan area. As they have in other American cities, intercity motor truck facilities have grown up within Chicago as a result of independent and unplanned action on the part of the separate companies involved. The result has been a clearly defined pattern of activity based upon the Central Business District as a major traffic source surrounded by individual intercity common carrier terminals which, in turn, act as foci for highway freight movement between terminals and outlying entrance points.

Terminals. Freight interchange terminals are the primary Chicago destination of highway units of intercity general common carriers. The localization of these facilities and the special structural forms to which they are tending have created new land use patterns near the Central Business District. The agglomer-

ation of terminals also has given rise to problems of extreme traffic congestion resulting from the movement of large highway freight units into relatively restricted areas of already concentrated occupancy. Inadequate off-street parking lots, unsuitable converted facilities and joint use of structures have acted to emphasize functional limitations within the major terminal area.

Modern motor freight terminals designed for the freight-handling needs of intercity common carriers have appeared in the land use pattern of Chicago during the last twenty years.¹ As Figure 1 shows, the great majority of the structures occupied by Class I intercity common carriers of general freight have been erected since the latter part of the 1930s; the postwar period, particularly since 1946, has seen the greatest increase in terminal construction. The more than two hundred companies of this class have been leaders in the localization of terminals and the development of specialized facilities; their occupancy patterns are characteristic of intercity common carriers in general and form the basic core around which the highway freight transit industry of Chicago has developed.

Figure 2, showing the location of Class I carrier terminals as of January 1, 1950, displays the two chief features of motor freight facility concentration in Chicago: a primary grouping of terminals south and southwest of the Central Business District and numerous secondary agglomerations within and without the major localization.

¹The typical modern terminal has a characteristic "T" shape: the cross-bar of the "T" is occupied by offices of the company and the base is lined with loading platforms. On one side are found tractor-semitrailer units; on the other, local delivery trucks. Cross-dock operations, in which loading, unloading, and interchange of freight is carried on between the two types of vehicles with a minimum of movement and handling of cargo, is typical of this type of facility.

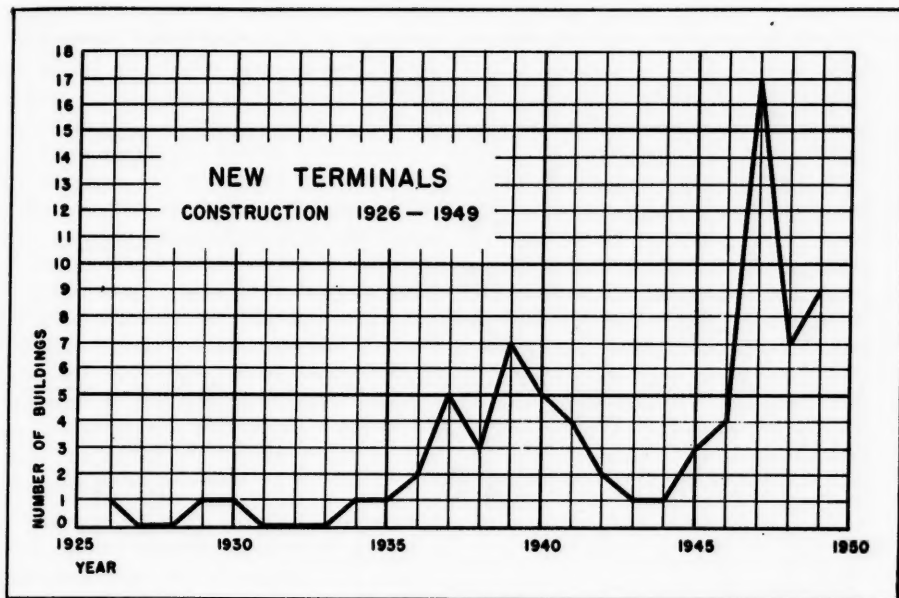


Figure 1—New Terminals: Construction 1926-1949. Number of Buildings Occupied by Class I Intercity Common Carrier of General Freight.

The development of commercial trucking in Chicago supplies the key to this pattern. It began as a local cartage operation centered about the light manufacturing and retailing of the Central Business District and the downtown team tracks and freight houses of the railroads. Terminals of early contract haulers and of the later longer-distance transporters were localized near this center of business. The growth and specialization of activity characteristic of the past fifteen years rendered earlier makeshift facilities inadequate in both size and design and new terminals were constructed south and southwest of the Central Business District in areas where vacant, low-priced land was available. Secondary groupings of terminals within or without the primary agglomerations have resulted largely from joint occupancy of buildings by two or more individual carrier companies or from the speculative

construction of several buildings upon one tract of land by a contractor.

The 237 motor carriers discussed here² which have terminals in Chicago are housed in 159 separate buildings (Fig. 2).³ Of these, 118 structures are occupied by individual companies and the remaining 41 buildings have multiple occupancy involving 119 separate firms. Voluntary consolidation within terminals is thus seen to involve 50 percent of all these carriers; such grouping is characteristic of those firms whose Chicago operations are insufficient in volume to warrant the expense of an individually maintained terminal.

In general, consolidation within a single building involves only two com-

² Carrier companies were tabulated from American Trucking Associations, Inc., *Financial and Operating Statistics of Class I Motor Carriers of Property. First Quarter, 1949-1948* (Washington: American Trucking Associations, Inc. 1949) and from *Classified Telephone Directory of Chicago* (Chicago: Reuben H. Donnelley Corp., June, 1949).

³ Data corrected to January 1, 1950.

largely outweighs the economic advantages to the individual small operator to be found in single occupancy. Non-carrier construction of larger structures leased to two or more smaller operators has been a solution to this difficulty and has resulted in such important developments as that in the South Iron Street area, so prominent on Figure 2. Historically, conversions were the original terminal facility type and, as such, have retained a closer relationship with the Central Business District (on Fig. 2 bounded by the Main and South branches of the Chicago River and by Roosevelt Road and Lake Michigan) than have newly constructed motor freight buildings.

There are three distinct tenancy patterns found among carriers of the type described here: (1) Consolidated terminals are generally not owned by tenant companies; space in multiple-occupancy buildings is leased by individual firms from either the contractor-owner or a terminal company operating the premises. (2) Occupants of individual converted terminal facilities are predominantly lessees, not owners. (3) Occupants of individual, original terminals are generally owners, not lessees.

The recent maturation of commercial intercity trucking and the increasing volume of traffic centering upon Chicago, particularly in the postwar period, have found many carriers inadequately housed. Those operators located in consolidated buildings—either new terminals or conversions—and those located individually in converted buildings give a nearly 50-percent response indicating their desire to move to more spacious facilities, while a higher proportion of firms located in converted quarters desire to move because of deficiencies in operating convenience. The relocation of these carriers in new buildings within

the present concentration of terminals would multiply existing problems of traffic congestion and building density; their movement outside of the present terminal area, by altering the destination point of a large share of entering highway freight vehicles, would increase the already numerous problems of heavy vehicular movement along Chicago's street system.

Truck routes. Over-the-road common carriers supply the most distinctly channeled truck traffic pattern within urban areas. From their arrival within the metropolitan district at any one of several entrance points, intercity carriers proceed as directly as possible to their home terminals—their primary destination. Local delivery vehicles of private or commercial carriers, on the other hand, appear on every unrestricted avenue of the city; their traffic patterns, within Chicago at least, show some concentration of movement within the light manufacturing and commercial zones of the city but in no case so completely dominate the traffic movement of a few routes as do the highway units of intercity haulers.

Figure 3, based on the reports of nearly 400 over-the-road common carriers, shows the 24-hour tractor-semitrailer traffic flow of these companies in the Chicago area as of July 1, 1949.⁴ The gross pattern is easily recognizable: the area of terminal concentration (Fig. 2) is the origin and destination of over-the-road units and is reached primarily from the south. Altogether, some thirty approaching arteries consolidate at or near the corporate limits of Chicago into twelve city trucking routes. The number of routes entering the city from the west

⁴ Data from a survey conducted by the Mayor's Committee on Motor Truck Terminals (City of Chicago). The map includes the routes of the 237 Class I intercity common carriers of general freight whose terminals are shown on Figure 2.

is almost equaled by the number leading south; two routes enter from the north, while the southeast, southwest, and northwest portions of Chicago have but one entering traffic stream apiece. The greatest volume of traffic, however, arrives from the southeast; nearly one-half of all tractor-semitrailer movement is channelized into two routes entering the city from the southeast and south. The volumes of traffic arriving and departing from Chicago in the remaining directions are approximately equal although the combination of northern and northwestern routes carries slightly more traffic than do western and southwestern routes together.

Although there is some traffic across the city on all truck routes the majority of intercity traffic on arterial avenues is destined for the south and southwest side terminal area where cargo is interchanged with other carriers or transferred to delivery vehicles.

The Chicago street traffic flow of common carrier highway units is as distinctly channelized as entering traffic (of which it generally is a direct continuation). The majority of the streets carrying more than 1,000 such vehicles each 24-hours are found to the south of the principal concentration of truck terminals (north of 55th Street Fig. 2). As with entering traffic, major movement is toward the center of the city from its northern and southern extremities and secondary city routes are in the main minor approaches to the terminal area.

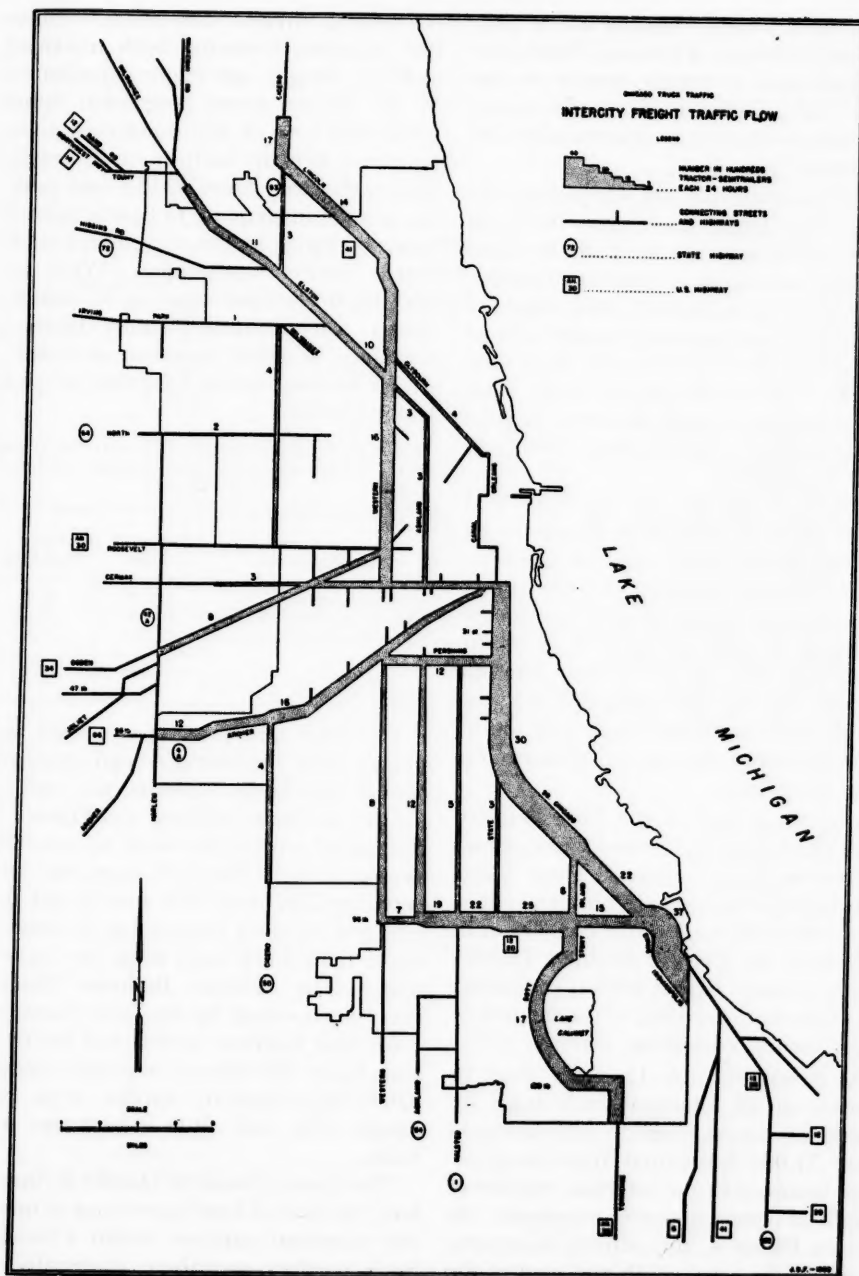
The principal traffic distributor in Chicago is 95th Street (Fig. 3). Although the major portion of entering traffic from the southeast leaves 95th Street at South Chicago Avenue to proceed diagonally to State Street and the terminal area, some 40 percent of entering tractor-semitrailer units continue west on 95th, subsequently to turn north on such alter-

nate streets as State, Halsted, Ashland, or Western after being joined by nearly half of the highway units reaching 95th Street along Stony Island Avenue. There is no analogous traffic distributor on the north or west sides of Chicago where entrance movement is distinctly less channelized and of lesser volume.

Although tractor-semitrailer units follow established routes through the city, the streets used are not in all cases designed for easy passage of the heavy vehicles. This is a direct result of the multiple-purpose nature of the majority of these avenues and of the steadily increasing demands made upon existing trafficways; it is only incidentally subject to alleviation by street repair and traffic restrictions. Each of the major routes has, for part or all of its length, streetcar facilities which occupy the center sixteen feet of its roadway, reducing the motor traffic capacity of the artery; many have differentials in pavement width which form "bottle-necks" for vehicular flow. The numerous right-angle turns, multiple intersections, and off-set roadways existing as a matter of course under Chicago's rectangular street pattern with superimposed diagonals and sequential platting do much to hinder the free flow of all traffic and particularly of tractor-semitrailers because of their size and comparative lack of maneuverability.

Pickup, Delivery and Interchange of Freight.

The route and terminal associations discussed above form but a part of the total traffic and facility pattern of commercial intercity operators in Chicago. As part of their over-the-road services, highway common carriers provide pickup and delivery of merchandise for shippers and consignees in the city and regularly exchange interline freight at the terminals of other carriers. These operations form a two-fold density of activity within Chicago: one concentration in and near



the Central Business District where pickups and deliveries of Chicago freight are localized and a second density to the south and southwest of the downtown area where interline freight transfers are performed (Fig. 4).

Each business day 128,400 pickup, delivery, and interchange stops involving nearly 5,900 vehicles are made by these intercity common carrier companies. Over 107,000 individual truck stops are made daily for non-interchange cargoes of which, as shown in Figure 4, more than 56,000 stops or 43 percent were completed in the Central Business District and in the Near North, Near West, and Near South sides.

Although pickups for the city as a whole equal more than 58 percent of all noninterchange truck stops for over-the-road common carriers, in few other sections of Chicago is the ratio so strongly expressed in their favor as it is to the north and west of the Central Business District. In the predominantly residential sections of the far north and southwest, deliveries far exceed pickups for these companies.

More than half of the local delivery vehicles of intercity common carriers are tractor-semitrailer units. These units add disproportionately in relation to their numbers to the total traffic congestion in and near the Central Business District and to a large extent are an indication not of absolute need but of duplication of effort among competing carriers.

As shown in Table II, more than 16 percent of all Chicago truck stops by intercity common carriers—amounting to some 21,000 individual interchanges—were involved in the interline transfer of freight at common carrier terminals. As seen in Figure 4, this activity is concentrated in the areas south and west of the Central Business District and partially overlaps the zone of intensive non-

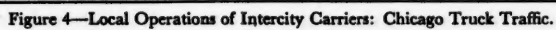
interchange freight movement. Interline transfers, involving both truckload and l.t.l. freight, are major contributors to the intense street congestion found south and west of the downtown zone. In these already built-up and heavily traversed areas, street widths and parking lots are inadequate to handle normal noninterchange freight movements of the tenant carrier companies. With the additional constant shunting of straight trucks and semitrailer units between terminals to effect transfers of freight, streets become totally congested at peak traffic periods.

TABLE II—ESTIMATED ONE-DAY INTRACITY OPERATIONS OF 492 OVER-THE-ROAD COMMON CARRIER COMPANIES: OCTOBER 15, 1949

Type of Operation	Number of Stops	Percentage of Total Stops
Interline connections.....	21,000	16.4
Noninterchange pickups.....	62,400	48.6
Noninterchange deliveries.....	45,000	35.0
<i>Total</i>	128,400	100.0

The total number of truck stops per square mile for over-the-road common carriers has been estimated for each of the 46 sections outlined on Figure 4. Compared with a city-wide square-mile average of some 580 truck stops, the area between Lake and 35th streets and the lake and Ashland Avenue has no density lower than 2,800 total stops per square mile. The Central Business District (here represented by the zone between Lake and Harrison streets and the river and Lake Michigan) averages nearly 5,000 total intercity carrier stops per square mile with little interchange activity.

The Central Business District is, therefore, the hub of local operations of intercity common carriers within Chicago. Such carriers contribute materially to the intense street traffic congestion within and near the central portions of the city.



Their active presence within these areas cannot, of course, be totally halted but in considering the problem of the reduction of freight traffic movement around the central business districts of any city the question to be posed is: To what extent is freight traffic flow within such areas the result of unnecessary duplication of activity among competing carriers of the same general class and to what degree can superfluous vehicular movement be eliminated?

Urban Planning for Intercity Common Carrier Motor Traffic

The traffic and facility patterns of Chicago, described above, are repeated with minor variations in the majority of large metropolitan centers of the country. These patterns—the result of unplanned and uncoordinated development taking place over a period of more than thirty years—have in recent years impressed themselves upon urban planners as major contributors to progressive deterioration of internal circulation within urban areas and to residential and commercial blight near central business districts.

The planner is confronted with three basic problems: first, to uproot the intercity truck terminals from their present localization near the hearts of urban centers—thus to remove land use conflicts and extreme local traffic congestion resulting from their presence; second, to reduce as much as possible the number of intercity common carrier local delivery vehicles appearing throughout cities in the performance of duplicate services; and, third, to facilitate the movement of highway freight units from outlying entrance points to existing terminal areas.

Union truck terminals have seemed to many planners to be ideal solutions to the first two problems; where such union terminals are located on the periphery of densely urbanized areas the source of the

third problem is also removed. Union truck terminals generally imply community sponsorship; dock space is leased to participating carrier companies and consolidated pickup and delivery services are performed by local carriers franchised to serve specific territories of the city in the interests of all highway operators housed in the union buildings. The advantages to the participating carriers are deemed to be lower operating costs and terminal expenses (although this has not in all cases proved to be true), while the community would profit by the removal of numerous scattered individual terminals and by the reduction of competitive pickup and deliver operations throughout the metropolitan area. A series of such terminals is being constructed under the jurisdiction of the Port of New York Authority within the New York metropolitan district, although not all are to be located outside of the zone of intense urban development. Similar plans have been advocated for Atlanta, Georgia, Milwaukee, Wisconsin, and other cities.

Preliminary planning proposals in Chicago have been directed toward the grouping of individual operators within four union truck terminal areas. The first of these, as proposed by the Mayor's Committee on Motor Truck Terminals during Spring of 1950, would front on Western Avenue and the Illinois-Michigan Canal not far removed from the present concentration of trucking activity as shown in Figure 2. Union terminals located so far within the Chicago metropolitan area, while offering a solution to many existing problems of terminal area congestion and superfluous pickup and delivery movement, fail to relieve the strain imposed on multiple-purpose streets carrying entering highway units through the city. To answer this latter objection, Chicago's developing network of expressways must be opened to tractor-

semitrailer traffic and, perhaps, separate truck routes be planned to carry highway vehicles off of expressways to union terminal districts.

Fortunately, the problem of relocating the centers of intercity truck terminal concentration and the alteration of the flow of highway freight traffic within urban areas is not as complicated as would be similar changes in the pattern of railroad routes and facilities within the same centers. Greatly to simplify the issues, the basic obstacle to planning a new pattern of railroad activity lies in the barrier-like quality and relative immobility of railroad structures and in the high capital investment by railroads in present facilities. For commercial highway carriers the problems are personal rather than economic, for while motor carrier terminals are relatively mobile

and inexpensive and while there is no investment in established truck routes, the great number of individual and independent operators who must be made to co-operate presents a distinct obstacle to widespread relocation or consolidation.

It seems apparent that the quickening interest among city planners in the urban problems provoked by the independent and unregulated activity of intercity common carriers indicates a growing realization that action should be taken to safeguard the interests of the general public by reducing unwarranted congestion and land use conflicts created by such carriers. Whether union truck terminals are the most desirable solution for every major metropolitan area is doubtful; certainly intensive study of the intercity truck traffic and facility patterns of each city must precede proposals designed to fit local situations.

Otto Schiller's "Farming Cooperative:" A Critical Appraisal

By KARL BRANDT*

IN "The Farming Cooperative: A New System of Farm Management," published in the February issue of *Land Economics*, Professor Otto Schiller of Hohenheim presented an idea of his which is bound to be of considerable interest in countries where a multitude of small and medium-sized family farms prevail. It is an attempt to solve the complex problem of mechanizing whole family-farm systems by rearranging the available capital, the land, its management and operation in a certain way. It is claimed that the idea is at least one answer to the question of speedy, effective, and economical mechanization of thousands of small, poorly equipped farms.

Naturally, such an idea cannot fail to be of keenest interest to many countries in Asia, eastern Europe, or in the Mediterranean. It deals, after all, with a problem for which the Soviet Union has found its own solution. The idea was discussed at the International Conference of Agricultural Economists at Stresa in 1949.

What makes this idea even more attractive to analyze and discuss is the fact that it is more than just an idea; its author had the unique opportunity of trying it out in a more than life-sized experiment with almost 380,000 farm families. The experiment was undertaken with farmers and land which had previously undergone the Lenin-Stalin treatment to achieve quick mechanization via the establishment of the kolkhoz.

I presented Professor Schiller's article

to the editors of *Land Economics* first because any idea claiming to offer a simplified and quick solution of the immensely important problem of increasing the efficiency of family farms based neither on individual enterprise nor on the kolkhoz system must be carefully tested. But beyond that, I find that in the modest simplicity of its presentation and reasoning, Professor Schiller's article raises such an enormous range of questions that it might well occupy the attention of a graduate seminar in agricultural policy for an entire semester. The reasons for this may emerge as the major clusters of economic, social, and political problems raised are sketched.

An attempt to lead this discussion to any conclusion within the bounds of a single article remains just as futile as was Professor Schiller's effort to give a complete report of his new system in the same form. His article is in many ways a greater enigma by reason of the host of important aspects that do not appear in the discussion than because of those that are dealt with.

What does the author claim? *First*, that while even before World War II the idea of applying cooperative principles to management and operation of farms had been considered and some tryouts made, his experiment in occupied Russia provided the first large-scale experience with it. The implication is that the historical pragmatic test proved the future applicability of the solution elsewhere.

As a cautious scholar and experienced diplomat, Professor Schiller has also stated that it cannot yet be said that other countries with a similar agricultural

*Economist and Professor of Agricultural Economics, Food Research Institute, Stanford University.

structure could make practical use of the lessons taught by the experiment. In fact, he specifically says that he does not suggest the application of this particular system to other countries, but he adds that in countries where small farms prevail, cooperation should be promoted with reference to production. This, however, hints again at the feasibility of using the new system for agrarian reform.

Second, it is claimed that the new system was used as a means of agrarian reform by which the kolkhoz system of the Soviets was abolished. This reform is said to represent a synthesis between the incentives and initiatives of private ownership and enterprise with a rational crop rotation and extensive mechanization.

As to the first claim, I am at a complete loss to understand how one can conclude from the scope of the German experiment in Russia and the fact that the "farms" were functioning somehow, that it is a valuable precedent in the mechanization of under-equipped small family farm systems. To begin with, there is not the faintest analogy between the situation of densely populated family farm systems in areas outside the iron curtain and the situation which the German military occupation found on Soviet territory. The original land-tenure system and land distribution that existed before the Bolshevik revolution of 1917 underwent various violent changes until forced collectivization in the early 'thirties replaced the last remnants of it by the kolkhoz system which, incidentally, the Soviet government considers also as a "cooperative" form of farm management. In the kolkhoz all means of production including the land are in collective usufruct. The tractors are state-owned and rented to the kolkhozi. In the process of forced collectivization the major part of all livestock was lost and had not been

replaced, for the most part, by the beginning of the war. Large numbers of them were lost in Stalin's scorched-earth strategy and the retreat of the Red Army during the war. Many of the MTS-owned tractors were either removed or destroyed. Many of the managers and the tractor mechanics and operators had also left.

How can one consider this as a proper analogy to the situation in the villages of, say, India, Indonesia, or Italy? In order to make the situation comparable, the human tragedy and the incomparable waste of a sequence of bloody land-distributing and productive-asset-consuming peasant revolution and forced mass collectivization would have to be repeated. In other words, instead of reforming a peasant economy, one would first have to destroy it and replace it by a collective system.

Furthermore, what the German military government made was anything but a disinterested objective effort to create a system of land tenure, rural settlement, and farm management and operation which could combine the legitimate pursuit of happiness and human satisfaction with efficiency in production, farm consumption, and marketing. No military government will ever be able to do this, even if so ordered, and even if it had the time or the means by which to make the attempt. The German military government had the difficult task of getting food production restored at maximum speed under the emergency situation in a land precariously held by a fighting army within its sovereignty. It had to try to fulfill the exorbitant claims for Reich food deliveries constantly pressed by Berlin, and therefore wanted—as the Soviet government had earlier—a farm system that would assure easy control and maximum delivery of farm produce. It had to make the best of the

scanty supplies of mechanical equipment available. For reasons of military security and political control, i.e., the same reasons as those held by the Soviet government, a form of management and tenure was needed that would better lend itself to public supervision than would a system of independent family farms.

These reasons were partly those of a centralized power state (i.e., an army of occupation in enemy territory), and partly merely adaptations to the emergency situation in the midst of a world war. They all pointed to the preference for leaving intact the kolkhoz farm organization.

However, the genuine hatred of the kolkhoz system which the farmers felt and displayed in all parts of Russia which came under German occupation made it politically expedient to make certain concessions to the yearning for individual property rights and freedom of management. While the Nazi party bosses pursued the policy of treating all Slavs as "Untermenschen" (sub-humans) the Wehrmacht followed a different line by way of compromise which eventually gave Professor Schiller's idea a chance. But the "farming cooperatives" in the occupied territories were nevertheless large-scale farms with central management and a certain concession to people's deeply ingrained longing for private property and freedom of enterprise. This led to the weird quilt pattern of scattered strips characteristic of Dr. Schiller's farming cooperative.

Under the circumstances the system seems to have worked. Probably it fulfilled the very limited expectations which the German military government entertained with reference to it. It may well be that technically there was little else to do under the circumstances, although even this is questionable. But it may

also have been that with less demand for food requisitions, granting home rule and real private property in land to the fifty million Russians under German occupation, there might have been wholehearted cooperation instead of gradual rebellion against oppressors who insisted—as the Soviets had done before—on efficiency of large-scale production, and who made threadbare concessions to human values.

So far, I already disagree with Professor Schiller in his evaluation of the military-government experiment which he considered to be a real solution of the farm problem in Russia for the postwar period if Soviet rule had not been restored.

But the present discussion does not concern the farming cooperative as an expedient arrangement for a military government in occupied Soviet territory, nor Professor Schiller's experiment as a real key to the satisfaction of the people concerned. What is of interest today is this: is the farming cooperative a system which may solve the problem of how to improve the productivity of densely populated family-farm systems?

In order to answer this we may first try to check a little more closely on the real features of the system. This is exceedingly difficult because the most crucial questions concerning the code of rural law are not revealed. Yet it is apparent that the system is not merely one of farm management, as the title of the article suggests, but in its very essence is a radical alteration of the institution of property. In Professor Schiller's farming cooperative the "bundle of rights" constituting "private property" is so badly depleted by comparison with the Western concept of property that one might well ask whether it is not a misnomer still to call it property. A farm tenant with a year-to-year lease is a king compared with a member of a

farming cooperative. The title to the scattered strips is burdened with the following limitations: the "owner" is deprived of the prerogative of deciding freely whether he wants to grow crops or fruits or grass, what crop to grow, the time or depth of plowing or cultivation, or harvesting. He cannot put up a fence or plant fruit trees. In short, he is deprived of the most decisive right for maximum development of farms by giving freedom of experimentation and development according to individual capacities—namely, the right of management. The blueprint quilt pattern is not a distribution pattern of free property but a system to which farmers are tied like the workers in an automobile plant are fixed in their places at the motor-propelled and manager-controlled assembly line. Beyond that, no changes can be made by leasing land or selling parcels in order to change the size of the farm. Instead of adjusting the property or leases and the machinery to the needs of the farmer and his family, the procedure is reversed. The people and their rights are forced into the Procrustean bed of a large-scale or plantation enterprise. This, however, is the feature typical of the Soviet economy of today.

The crop rotation is given as one reason for the arrangement of the fields. But since when has it become desirable to freeze the crop system into a certain fixed rotation? For many reasons it may be desirable to change the rotation, and various farmers in a village may have similar yet greatly different rotations.

The use of tractors and tractor implements is given as the key reason for scattering strips over consolidated fields and *gewanne*. This implies that small farms cannot use tractors efficiently. However, Germany's leading tractor and farm-machinery engineer, Professor C. H. Dencker of Bonn, has stated that the

use of tractors becomes more costly only when the individual field to be plowed or cultivated shrinks to less than 2 hectares in size. Professor Schiller had from 7 or 8 to 15 hectares or more of land available per farm. The larger ones would, even with 8 fields, have had almost 2 hectares each, while the smallest ones would have had either 3 to 4 fields of 2 hectares or 7 to 8 fields of 1 hectare.

The other reason for the cooperative use of machinery concerns the need to utilize the investment better so as to reduce costs. This can be achieved, of course, by having tractor owners work for hire for other farmers. But even if co-operative ownership of some machines is chosen, it need by no means comprise a whole village, nor does it require a large-scale-farm layout.

There is no reason to assume that in normal circumstances the only type of machinery available would be what the former MTS stations owned in Soviet Russia. Fortunately, farm-machinery factories turn out a great variety of sizes and types of equipment which are suitable for small farms and operate with almost the same efficiency that much larger units do. Nothing is said specifically about the managers of either the historical farming cooperatives in occupied Russia or of an adapted peacetime version. Who appointed them? Were they elected by the farmer members? Probably the German military government appointed them. But if they were elected, the question still remains—who made the decisions on all questions of management? Is it conceivable that the procedures of voting and ballots could be applied without hampering effective management and operation? If the members give full power to the manager, they give away the birth-

right of a family farmer and become mere laborers.

Either Professor Schiller's system functions well technically, in which case it is run like a kolkhoz with some immaterial private-incentive window dressing, or it is run with democratic processes, in which case it is ineffective, quite aside from the fact that in either case the arrangement is, as seen by the members of the cooperative, the antithesis of private enterprise. In both cases people are put into a sort of factory arrangement which yields low average results and wastes the advantages to be derived from giving every farm family the opportunity to perform to capacity as regards talents, preference, or financial means.

The feature of operating the livestock as a collective enterprise only demonstrates the extent to which the farming cooperative frustrates the great potential opportunities of the family farm, which concern particularly the individual care of animals and their integration into the organization of the individual farm.

But there are many other very weighty curtailments of freedom wrapped up in the package of the cooperative, only one of which will be touched upon—one which, interestingly enough, the advocates of cooperative farm management never mention, in this country or elsewhere. I refer to the procedure of accounting for the wealth of the cooperative and of paying their share in the equity to members who withdraw. All cooperatives form anonymous capital in their equipment, buildings, inventories, and reserves. These assets are built up by the work of the members, and each of them theoretically "owns" a share in it. At least this is what newcomers are told. So long as the coop-member has the benefit from the use of such capital, no problem arises. But suppose he or his

wife or a child becomes ill and entirely through no fault of its own the family is forced to move away. What then is the provision for getting paid in cash for their share in this community wealth? The chances are that the statutes or the vote of the assembly decide in favor of maintaining the strength of the common enterprise and of paying as little as possible, if anything, to the departing brethren. In the farming cooperative it may well have been the case that no provision was made. No, the farming cooperative definitely does not offer a sound solution to the problem of improving the economic performance of large systems of family farms. Such a solution cannot be found in the construction of a large-scale farm layout and the drastic curtailment of property rights to the exclusion of the right of management. The field layout can be changed with a consolidation of the property of each owner in such a way that tractor work is least obstructed. Cooperative buying of farm needs and selling of farm produce can help a great deal. But otherwise the full right of management must be safeguarded for the family farmers.

In the farming cooperative the family farms actually disappear in the process of plucking almost everything from the bundle of rights of property. What appears and remains is a plantation or large estate. This reform leaves the land distribution as a rigidly cast form. The little land reserved for adding a few newcomers does not alter this because the new members of the coop will be just as much large-estate workers as the others.

A land-distribution system that will conform to the needs of development and change in the economic life of a nation must have flexibility. It must permit of the sale and lease of land, and of adjust-

ment in the size of farms toward the proportion of more economical units. If farms are too small to use their own machinery and to utilize all their manpower, their owners must be able to choose to seek outside work and rent their land to neighbors, keeping their houses. The farming cooperative takes it for granted that every farm family must have the same amount of land. It implies simply that this is so. In the experiment it was so because the German military government or the Reich Commissioner decreed it. But what about using the farming cooperative as the solution for the improvement of efficiency of production in India? Is all land taken from the owners thrown into the pool, and then redistributed in equal shares among all families? Why should this egalitarian system prevail? This system of dividing the productive resource, land, neither corresponds to need nor to ability to produce.

One should not be mistaken about the nature of the introduction of this solution. On paper it may have some faint similarity to agricultural reform. One presumably changes the pattern of the field layout on the map and the form of management. In reality, the changes cut so deeply into the life of the people, into their freedom, responsibility, their opportunities and their happiness that

their execution means bloody revolution. So far, people in various parts of the world still fight when it comes to the forced exchange of freedom for efficiency of "cooperatively" integrated production units and to being de-rated from farmers to workers. Hence, statesmen who may be tempted to choose Professor Schiller's farming cooperative as the short cut to a supposedly faster mechanization of family farms should include in their cost calculations machine guns and concentration camps. The less educated small farmers are, and the poorer they are, the more closely do they cling to the piece of land they cultivate, whether it be land they own or land they perennially lease.

This evaluation of the political and social consequences of introducing the farming cooperative is not to be interpreted as a desire to dramatize the criticism; it derives from study of the long and bloody history of farmers' fight for this right to individual management of land. Of course, Professor Schiller has never shared the views of the totalitarians, and we must credit him with a good deal of knowledge about field systems, agrarian reform, and Russian agriculture. He is the last person who would want such destructive consequences or who would be willing to apply force.

An Investigation of Economies of Large Size in Steam Stations

By JOHN B. LANSING*

I. Introduction

ECONOMISTS have long been interested in the general problem of the relation between the size of plants and average total cost per unit of output because of its bearing on ideological controversies over the future of competition. To the extent that only large units are efficient in an industry it is difficult for small business to survive in that industry. On a different level, the relation is of interest because it underlies the long-run cost curves of economic theory.¹ Attempts to study the relation between size of plant and cost are, however, rare, owing to the multiplicity of factors other than size which influence costs.

The costs of steam central stations are easier to analyze than the costs of other types of plants for two reasons: First, the product, electricity, is homogeneous in a physical sense, in contrast to the output of, say, a steel rolling mill. Second, the accounting records of steam stations approach comparability more closely than those of many types of plant owing to the uniform system of accounts prescribed by the Federal Power Commission and the several state public utility commissions. The present study was

undertaken in the hope that with these advantages it would be possible to get some general notion, at least, of the relation between size of station and the cost of steam-generated power.

It must be emphasized that this investigation is not a general study of the factors influencing the cost of power from steam stations. The rise in prices which has occurred in recent years, for example, is of interest only secondarily. The purpose of the investigation is specialized: it is to uncover the relation between size and cost, other things being equal. The work was undertaken with the fear that the results would be crude but in the hope that they might prove enlightening; the first expectation has not been disappointed, the reader must judge as to the second.

Economists who have not had occasion to become familiar with electric generating stations may find a few facts about one of the larger units helpful in understanding this study. The Springdale Station of the West Penn Power Company added a new 80,000 kw. unit in 1945.² The unit cost was about \$8,000,000. From the base of the stack to the bottom of the ash pit is 195 feet, the height of a 17-story office building. The turbine and generator are mounted on a single shaft which is 68 feet long. This study includes data on stations which range in capacity from 5,000 kw., or one-sixteenth of the capacity of this unit, to 360,000 kw., or four times as large.

In the present study, accounting and engineering data have been used jointly throughout. The engineering data have

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¹ For most practical purposes, a long-run cost curve for a plant may be regarded as a curve showing the relation between size of plant and total cost per unit output at a fixed plant factor, other things being equal, i.e. all prices, the state of the art, the peculiarities of the site, the peak load on the plant, etc., being taken as fixed. More strictly, a long-run cost curve for an entrepreneur is a curve showing the lowest possible average total cost of producing any output when the entrepreneur has adequate time to make all desired adjustments but all factors beyond the control of the entrepreneur remain constant. See, for example, the discussion in George J. Stigler, *The Theory of Price*, (New York: The Macmillan Company, 1946), pp. 138-142.

² Edison Electric Institute, *Bulletin*, February 1946, p. 51.

been garnered from interviews as well as published information. The accounting data consist of a sample of steam stations drawn from the reports made for the year 1945 to the Federal Power Commission by Class A and B Electric Systems. The basic sample used contains 90 stations, but full information on costs was available for only 61 of the 90.³ The tables in this article are based on this sample unless another source is indicated in a footnote to the table.

This report follows the Federal Power Commission's classification of costs, taking up first, "cost of plant," and second, "production costs," and discusses the subdivisions of each in order of importance.

II. Cost of Plant

The F.P.C., unfortunately, divides "cost of plant" into three categories only, "equipment," "structures and improvements," and "land and land rights." The median cost per kilowatt of rated capacity for equipment is \$72, for structures, \$22, and for land, \$1. These costs refer to stations in the sample described above, that is, to a cross-section of stations existing in 1945.

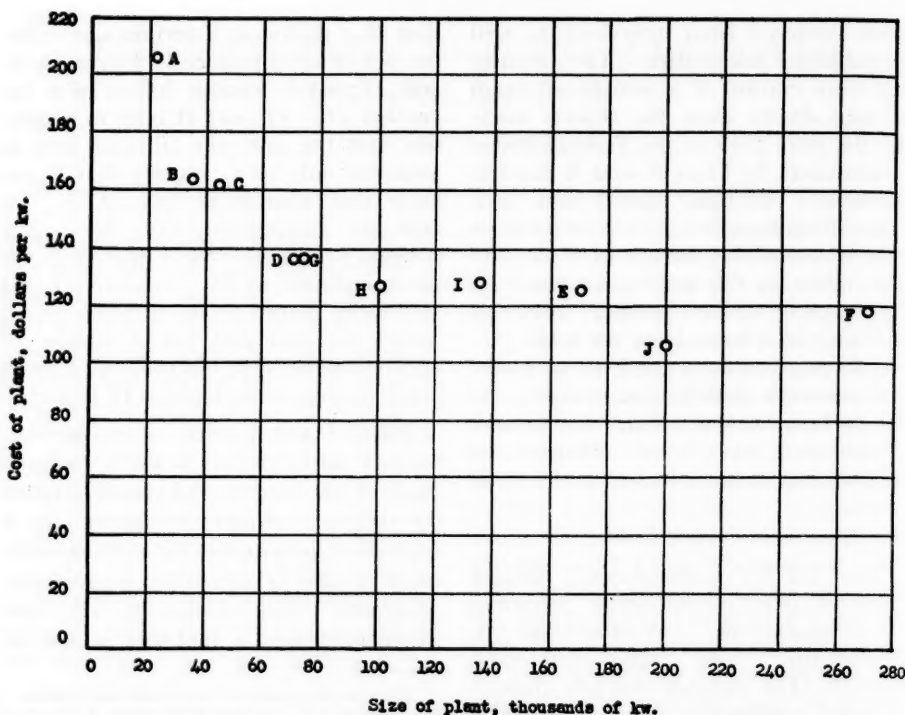
Total Cost of Plant. The few available engineering estimates of the relation between size of plant and total cost per kilowatt have been pieced together in Graph I.⁴ Points A, B, and C refer to estimated costs per kilowatt of different

sizes of a station at a certain site under one set of circumstances. Points D, E, and F provide similar information for another site. G and H refer to a third site, but the cost per kilowatt here is available only as a relative, that is, we know only that H is 93% of G. To facilitate comparison with the other stations, G was arbitrarily placed at the same ordinate as D. Similarly, I was arbitrarily placed at the ordinate which would be indicated for a station of appropriate size (135,000 kw.) by a smooth curve passing through points D, E, and F.

Points I and J refer to two stations built on adjacent sites at the same time. Each of the other sets of points is based on detailed estimates prepared by a contractor, presumably for a client interested in costs of alternative construction programs. The advantage of these fragmentary data is that they isolate the

⁴ There is some ambiguity surrounding the meaning of the "capacity" of a station in kilowatts, as persons in the industry are well aware but academic economists may not be. Manufacturers of turbo-generators customarily assign to each unit what is known as its "nameplate rating," and the sum of these items for the turbo-generators in a station is the "rated capacity" of the station, which is what is frequently meant by "the" capacity of the station. The actual load which a unit can carry, however, may be less but is usually more than the nameplate rating. Indeed the set of preferred standards for large turbo-generators adopted in February 1945 by the American Society of Mechanical Engineers and the American Institute of Electrical Engineers specifies that the guaranteed turbine capability shall be 10% above the nameplate rating of the unit. By guaranteed turbine capability is meant the guaranteed continuous output of electricity under specified steam and exhaust conditions when the turbine is clean. See S. H. Mortensen and others, "Standards for Turbine-Generators," *Electrical Engineering*, June 1948, pp. 548-9. The problem arises here because the points in Graph I were derived from two sources, and one source may have meant by "capacity" the rated capacity while the other may have meant the dependable capacity. For points A, B, and C and for D, E, and F the author is indebted to William F. Ryan of Stone and Webster Engineering Corporation. Points G and H and I and J are based on data published by Frank S. Clark of the same company in a letter to the *Electrical World*, April 6, 1940, p. 1059. If the two used the same definition, there is no need to modify the conclusions drawn above. If the definitions were different, the relative position of the points in the graph would have to be changed slightly, but the change could not alter the very limited inferences made. In the statistical material based on the sample from reports to the F.P.C., "capacity" is used to mean rated capacity.

³ The sample was drawn by the author. The original sample included every second steam station reported, not counting tiny stations under 5,000 kw. or antiquated stations still using reciprocating engines. It was later necessary to exclude several groups of stations from the sample including: (1) stations which reported operating costs but not cost of plant, (2) stations which sell both steam and electricity (excluded throughout as their costs are not comparable to those of stations which sell only electricity); (3) stations which operated below 10% of capacity for the year (excluded from tables showing adjusted cost at 50% of rated capacity since it is doubtful whether most of these stations could have operated at that level). Ideally, these exclusions should have been made before the drawing of the sample, but the author's judgment is that the sample remains essentially random.



Graph I—Engineering estimates of costs of plants of different capacities. See the accompanying text for a discussion of the meaning of the points.

effect of size since each set of estimates refers to a single site, one set of prices, and a given state of the art. From one set of points to the next, all these factors (and others) may vary.

The striking fact about the graph is that no simple curve could possibly fit all the points. Note the difference in slope between a smooth curve passing through D, E, and F, and one passing through I and J. Note, also, the difference between a smooth curve through D, E, and F, and one through G and H. The conclusion suggested is that there is no unique relation between size and cost of plant. In other words some factor or factors appear to be causing not merely differences in costs from one set of conditions to the next but differences in the relation between size and cost of plant.

The statistical relation between size of plant and cost of plant which is summarized in Table I is consistent with the conclusion that the relation between size of station and cost per kilowatt is markedly different under different conditions. An understanding of the reasons why total cost of plant behaves in this way requires study of component items.

Equipment Cost. A central station includes a great variety of equipment, but engineering data on the relation between the capacity of a piece of equipment and its cost are available for only two central items, turbo-generators and boilers, which between them amount roughly to a third to a half⁸ of the total cost of equip-

⁸Based on data compiled by A. E. Knowlton, "Fourth Steam Station Cost Survey," *Electrical World*, December 1939, pp. 1585-1600.

TABLE I—RELATION BETWEEN SIZE OF PLANT AND COST OF PLANT, SHOWING RANGE OF COST PER KILOWATT AND MEDIAN COST PER KILOWATT OF DIFFERENT ITEMS BY SIZE OF PLANT

ITEM	Size of Plant		
	Group I 5,000-24,000 kw.	Group II 25,000-99,000 kw.	Group III 100,000-358,000 kw.
Equipment.....	\$35-\$148 (\$133)* Md \$78 n-43	\$39-\$106 Md \$67 n-29	\$44-\$90 Md \$70 n-15
Structures.....	\$ 7-\$51 Md \$22 n-42	\$12-\$43 Md \$22 n-28	\$15-\$42 Md \$21 n-15
Land.....	under \$1-\$21 (\$13)* Md \$1 n-43	under \$1-\$8 Md \$1 n-28	under \$1-\$5 Md \$2 n-14
Total plant.....	\$45-\$180 Md \$106 n-46	\$62-\$137 Md \$88 n-29	\$60-\$140 Md \$96 n-15
ITEM	Average Size of Generators		
	under 10,000 kw.	10,000-24,000 kw.	25,000 kw. and over
Total plant.....	\$45-\$177 Md \$103 n-45	\$62-\$140 Md \$99 n-25	\$60-\$113 Md \$89 n-14

* The figures in parentheses indicate the value for the station with the second highest cost, shown only where the difference between the two highest cost stations is marked.

ment. Table II shows the approximate relation between the capacity and the cost of turbo-generators and boilers in 1945. Both tables show costs per unit of capacity decreasing at a decreasing rate as capacity is increased. Can one proceed from these relationships for individual turbo-generators and boilers to the proposition that the total cost per kilowatt of all equipment will fall at a decreasing rate as capacity is increased?

First, one must take into account that the number of turbo-generators per station varies. Data are available on the number of generators in 1940 in 80 of the 90 stations in the sample. Of the 80, 11 had one generator, 19 had two,

26 had three, 15 had four, and 11 had five or more. A station of 20,000 kw. thus, may contain one, two, or four generators. The cost of turbo-generators will not be the same in all stations of the same size but will depend on the number of generators.

The number of boilers per turbo-generator also may vary from station to station. Data are available for 68 of the 90 stations for the year 1940. Of the 68, 6 had less than one boiler per generator, 26 had 1.0-1.9 boilers per generator, 19 had 2.0 to 2.9, 10 had 3.0 to 3.9, and seven had four or more. Evidently, it is common to find anywhere from one to four boilers per generator. If two

stations contain identical generators but the first contains two small boilers and the second a single larger boiler, the second will show lower total cost, other factors being equal. When we take into account both variation in the number of boilers per generator and variation in the number of generators, we have reason to predict that economies of scale in the purchase of equipment will have widely different effect upon costs of stations of the same total capacity.

TABLE II—AN ESTIMATE OF THE APPROXIMATE COST OF NEW TURBO-GENERATORS AND STEAM GENERATORS IN 1945*

For Small Turbines: Capacity (in kw.)	Approx. Cost per kw. (installed)
1,000	\$37
3,000	26
5,000	24
7,000	23
For Large Turbines: Capacity (in kw.)	Approx. Cost per kw. (installed)
10,000	\$24 Single casing, 20 single flow
20,000	20
30,000	18 Tandem com-
40,000	16 pound, double
50,000	15 flow
60,000	
For Steam Generators: Capacity of Unit (lb. per hr.)	Cost per lb. Steam (delivered and erected)
	450 psi 650 psi 850 psi
50,000	\$1.60
75,000	1.39 \$1.64
100,000	1.28 1.49
125,000	1.20 1.38 \$1.66
150,000	1.17 1.32 1.60
175,000	1.13 1.28 1.56
200,000	1.11 1.26 1.53
225,000	1.10 1.24 1.50
250,000	1.10 1.23 1.49
275,000	..... 1.22 1.48
300,000	..... 1.22 1.48

* Note: Steam conditions: small turbines, 400/600 pounds per square inch, 750°F. max. temp.; large turbines, 650/850 pounds per square inch, 825/900°F.; all turbines 3600 r.p.m., single shaft; absolute pressure in condenser usually one inch of mercury.

Source: Gustaf A. Gaffert, *Steam Power Stations*, pp. 498-499 and p. 506. Gaffert states that his curves have been plotted from "data appearing in the literature, statements by manufacturers, and actual contract figures." The word "approximate" in the headings is Gaffert's; presumably the costs are approximate owing to variations in such factors as the detailed specifications of the turbines and in shipping costs.

Second, the relations shown in Table II are not invariant. They assume, in particular, that standard design will be used. Although standard designs for turbo-generators have been used increasingly in recent years, special designs are sometimes employed, in particular for very large units. The cost of designing equipment does not increase in proportion to the capacity of the equipment. For equipment not made from standard designs, new tables would have to be drawn up, showing much greater economies of scale.⁶

Third, when the number of turbo-generators in a station is increased, the capacity of certain of the other items may not have to be increased in proportion—it may not even have to be increased at all. For example, when a station is built, a crane must be installed in the turbine room, large enough to handle the largest parts of the turbine and generator when they are disassembled for maintenance. One crane will be adequate for two or three turbo-generators just as well as for one.

For one gas-fired plant, the list of non-repetitive items for a particular increase in the number of units was as follows:⁷

yard work, including railroad track
storehouse
traveling crane
water wells
fuel tanks in yard
lubricating oil system
fire protection system
machine shop and tools
laboratory equipment
oil system for circuit breakers and transformers

* See the discussions of design costs for steam generating units in John Van Brunt, "Discussion of 'Design Trends in 500-800 lb. Steam Plants,'" *Mechanical Engineering*, February 1937, pp. 108-109. Van Brunt estimates the cost per unit capacity of a specially designed 200,000 lb. unit at 70% of that of a 100,000 lb. unit, while Gaffert estimates the cost of a standard 200,000 lb. unit at 87% of a 100,000 lb. unit.

⁷ The author is indebted for this list to Mr. William F. Ryan of Stone and Webster Engineering Corporation.

water treating equipment
 waste water sump
 chlorine equipment for treating condenser
 water
 elevators

In these three factors (variations in the numbers of turbo-generators and boilers in a station of given capacity, variations in the relation between size and cost of individual items, and non-repetitive types of equipment) we have a part of the explanation of the complexity of the relation between size and cost per kilowatt first observed in Graph I. We cannot proceed directly from relations between the size and the cost of individual items of equipment (Table II) to a single curve for all equipment. Graphically the relation between size of plant and investment per kilowatt in equipment (or in total plant) can be shown more adequately by a family of points. These points should show, for each size of turbo-generator, the cost per kilowatt of equipment for a plant containing one, two, three, four, or more units. Such a diagram would take into account variation in the number of turbo-generators and the existence of non-repetitive items. To show the effects of variation in the number of boilers per turbo-generator or the importance of design costs would require either a very complicated diagram or sets of diagrams showing different families of points.

Table I summarizes the statistical relation between cost of equipment in dollars per kilowatt and size of plant. The range shown is very wide, particularly for the smaller stations, as we should expect in view of the preceding discussion. Part of the variation, of course, may be attributed to variables not inherently associated with size, notably the price level at the time when the station was built. Unfortunately, it would require more data than the author has been able to discover about the stations in the

sample to deflate cost of equipment by a price index. Central stations are usually built one or two units at a time, adding capacity as it is needed and replacing older units. Of 84 stations for which data are available, only 27 reported less than five years between year originally constructed and installation of the last unit which had been added by 1945. For 28 stations the interval was 20 years or more. To perform a satisfactory deflation, one would need to know how much of the total outlay now shown as the cost of the equipment in the station was incurred in each of the years since the date of original construction.

Structures. There is little engineering evidence on the relation between size of station and cost of structures and improvements. We do know that as the capacity of a turbo-generator or boiler is increased, the floor space which it occupies does not increase in proportion. For example, according to data published by Gaffert, as the capacity of a boiler increases from 25,000 to 250,000 pounds of steam per hour, the product of depth and width increases from 283.5 to 945 square feet;⁸ that is, as the capacity increases by ten times, the floor space increases by only three and a third times.

To calculate the dimensions necessary for the interior of a central station, however, one must arrange not only boilers and turbo-generators but an assortment of related items of equipment in such a way as to yield maximum efficiency of operation while allowing adequate access to the machines and providing clearances for the disassembly of each item for maintenance work.

The cost of structures, however, involves more than the cost of walls and roof to enclose a certain cubic area. Outlay for preparation of the site, con-

⁸ Gustaf A. Gaffert, *Steam Power Stations* (New York: McGraw Hill Company, 1946).

condensing water tunnels, fuel-handling equipment, and wharves and bulkheads may exceed the cost of buildings.

The economies of scale depend largely on these latter items, which in turn depend on the site. Take the cost of condensing water tunnels. Typically a large initial outlay is required for this item, regardless of the number of units to be installed, with the marginal cost of providing for additional turbo-generators falling almost to the vanishing point. The size of the initial outlay, however, will vary according to the site. For one 200,000 kw. station the cost of this item was \$4.45 per kw., while for a certain 75,000 kw. station the cost was \$1.55 per kw.⁹ Yet, on either site it would doubtless have been possible to erect a smaller station than was actually built, and these smaller stations almost certainly would have shown higher costs per kilowatt for condensing water tunnels than the stations actually built.

It is perhaps not surprising, then, that the statistical relation between size of plant and cost of structures, summarized in Table I, shows no simple correlation. An attempt to increase the correlation by deflating the cost of structures by a building cost index met with no success.¹⁰

III. Cost of Production¹¹

Any discussion of the cost of production in steam central stations must take into

account the strong effect of plant factor on cost per kilowatt-hour. (Plant factor is the ratio between actual output and output at rated capacity.) It is particularly important to take plant factor into account in comparing costs of stations of different sizes, since large stations tend to operate nearer capacity. Of 15 stations of 100, 000 kw. or over in this study, none showed a plant factor for 1945 under 30%, while of 75 stations from 5,000 to 99,999 kw., 35 had plant factors under 30%. Statistical discussion of total cost of production must be based on methods of adjusting each component for plant factor.

Fuel. The largest item in production costs is the cost of fuel. Graph II shows for the stations in the sample the relation between plant factor and fuel consumption in B.t.u. per kilowatt-hour, known as the heat rate. It also shows estimates prepared by engineers (in 1938) of the relation between heat rate and plant factor based on actual experience with different types of stations.¹² (Note that the curves are not based on the points shown on the diagram.) The curves are equivalent to short-run average cost curves for fuel.¹³ Since the cost of fuel makes up a large part of variable cost in the economists' sense, these curves may

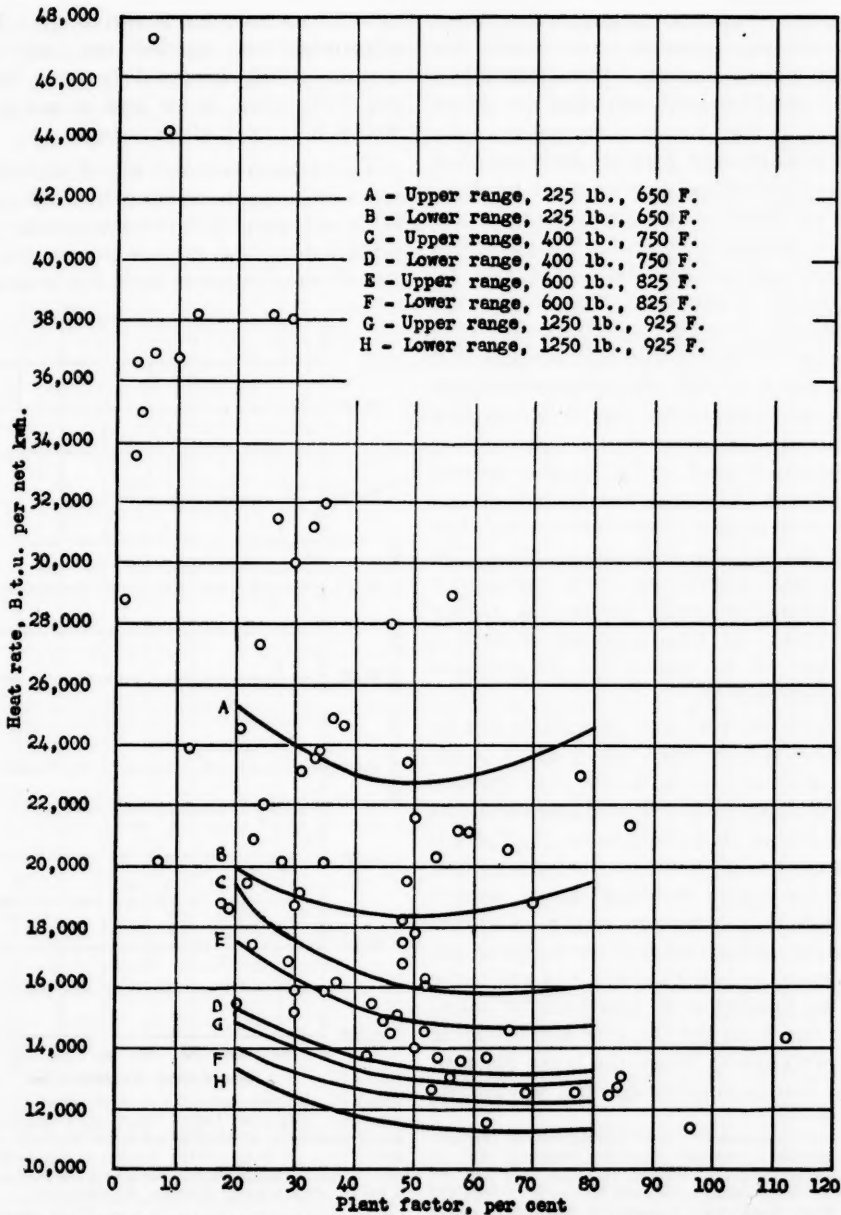
⁹ See Frank S. Clark, letter to editor of *Electrical World*, April 6, 1940, p. 1059.

¹⁰ The attempt at deflation was made for cost of structures rather than cost of equipment or total cost of plant, because the chances of making a satisfactory correction seemed greater. The price of equipment ought to take into account the quality of the equipment but no index is available which does so. In fact, no reliable general index of the total cost of equipment is known to the author; all that are available are indices of the cost of certain turbines, boilers, and condensers separately. In contrast, there is a widely used index of building costs published by the *Engineering News-Record*. Even more serious is the lack of precise information as to what parts of present equipment were installed at what dates. The assumption that the entire outlay for structures was made when the station was first built is not quite as far from the facts as the assumption that all present equipment was installed at the start.

¹¹ The term "cost of production" is used here since most of the statistics used in this section were compiled from accounting reports to the F.P.C., which uses this term. "Cost of production" does not coincide exactly with the economist's concept of "variable cost" since, even if a station does not produce any electricity beyond what it consumes, minimum outlays for maintenance, labor, etc., must be made to keep it in operable condition.

¹² These curves were prepared by C. F. Hirschfeld and R. M. Van Duzer of the Detroit Edison Company, and published in "Heat Generated Energy," *Proceedings of the American Society of Civil Engineers*, April 1938, p. 665. As indicated on the graph, the curves were intended to show the range of performance to be expected of plants with the indicated temperatures and pressures. Since 1938, higher temperatures and pressures than those shown have come into use, with resulting improvements in performance.

¹³ As the graphs are shown the vertical axis is heat rate rather than cost. The heat rates shown can be multiplied by an appropriate cost of fuel (in cost per B.t.u.) and the cost figures can then be shown instead without changing the body of the graph.



Graph II—Relation between plant factor and heat rate. Number of stations shown: 80. Data are available but not shown or the following points: 2%, 68, 560 B.t.u.; 5%, 58, 226 B.t.u.; 7%, 50, 362 B.t.u.; 18%, 51, 241 B.t.u.

Source for curves A through H: Hirschfeld and Van Duzer, p. 665.

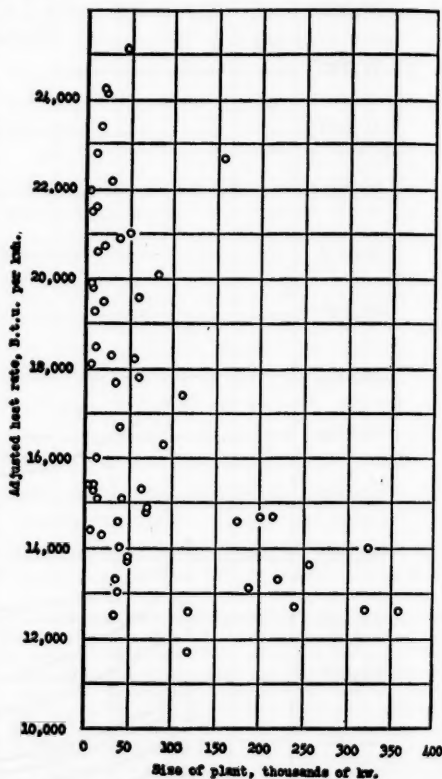
be taken as approximations to the short-run average variable cost curves for steam power stations. Note that all of them are U-shaped, but that the extent to which they turn up decreases as the temperature and pressure increase, that is, as the station becomes more modern.

The shape of average cost curves for fuel is subject to control. For any given turbo-generator or station, it can be predicted before construction, and the prediction can be checked against performance under controlled conditions.¹⁴ The point of best thermal performance can be modified by the designers of a station in the light of the shape of the anticipated load curve for the station. Operators of large power systems do not use the phrase "marginal costs," but they do use the equivalent phrase "incremental production costs," and they do distribute loads among the turbo-generators at their disposal in such a manner as to equate the incremental production costs.¹⁵

Since the heat rates of stations can be compared only after taking plant factor into account, the heat rate of 61 stations in the sample was adjusted graphically to heat rate at 50% plant factor.¹⁶ The adjustment was made on the assumption that the curves in Graph II are part of an infinitely numerous family of curves passing through each of the points in the diagram, and that the shape of any curve in the family can be predicted by interpolation from the shape of the adjoining known curves. Since the latter assumption is only roughly correct, the adjust-

ment for each station is also rough. The adjustment was carried out only for stations which operated between 10% and 90% plant factor and at not over 30,000 B.t.u. per kilowatt-hour.

The relation between size of plant and adjusted heat rate is shown in Graph III. Wide variation in fuel consumption appears among the smaller plants, but as size of plant increases there is a tendency



Graph III—Relation between size of plant and heat rate adjusted to 50% plant factor. Data are for plants with actual plant factor of 10-90% and actual heat rate under 30,000 B.t.u. per kw hr. in 1945. Number of stations shown: 59. Data are available but not shown for two points: 5,300 kw., 28,800 B.t.u.; 9,700 kw., 27,800 B.t.u.

for the range of variation to narrow and the heat rate of the most efficient plants to be lower. It is rare for large stations to show very high heat rates. There is

¹⁴ For an example of a curve relating thermal efficiency to output for a particular station, see Gaffert, p. 466.

¹⁵ Sophisticated mathematical techniques have been developed for calculating incremental costs by M. J. Steinberg and T. H. Smith of the Consolidated Edison Company of New York, Inc. See their book, *Economy Loading of Power Plants and Electric Systems* (New York: J. Wiley & Sons, Inc., 1943).

¹⁶ Fifty percent plant factor was chosen as a typical level of operations. The most efficient level would be much higher owing to the heavy fixed costs.

no station in the sample over 160,000 kw. with heat rate as high as 15,000 B.t.u.

Of course the price of fuel varies from station to station, and two stations with the same heat rate may have widely different costs of fuel per kilowatt-hour. Stations in the sample were found to have fuel costs ranging from $3\frac{1}{2}$ cents to 41 cents per million B.t.u., though the bulk of the electricity was generated from fuel costing much nearer the median of 19 cents.¹⁷ In estimates of total production costs the price of fuel has been taken at 18 cents for all stations.

Engineering evidence points to the same type of relationship found in Graph III. There is some slight improvement in the efficiency of generators as their size increases, and the same is true of turbines.¹⁸ More important, higher temperatures and pressures tend to be feasible only for larger units.¹⁹ Increasing the temperature and pressure of the steam brings important economies in fuel consumption which, however, accrue at a decreasing rate.

Labor. Both engineering and statistical evidence point to the conclusion that there is no great increase in a station's total outlay for labor as plant factor increases. The engineering evidence shows, it is true, that some increase in labor costs takes place as additional units are brought into production but, once the unit is generating, the rate of output makes little or no difference. Outlay for labor, therefore, has been reduced simply to labor cost per kilowatt. The relation (in 1945) between labor cost per kilowatt and size of station is

¹⁷ It should be kept in mind that these data refer to 1945. Present fuel prices are higher than prices in 1945.

¹⁸ See A. G. Christie, "Economic Considerations in the Application of Modern Steam Turbines to Power Generation," *Transactions of the Second World Power Conference*, Berlin, 1930, V, pp. 142-186, especially at pp. 152 and 170.

¹⁹ See the basic efficiency curves presented by J. R. Carlson, "Turbine Evolution Stabilized, Upping of Doubtful Economy," *Electrical World*, 1946, pp. 76-78.

summarized in Table III, which shows a sharp decline from small- to medium-sized stations and a much more modest fall from medium to large stations.

Maintenance. The third most important item in cost of production, and the one which is by far the most difficult to analyze, is maintenance. The difficulty arises in part from the fact that maintenance costs are often incurred in a different accounting period from the period of operation which made the maintenance necessary. For example, a particular unit may have been overhauled in June 1945, and the outlay necessary to recondition it would be recorded in 1945, but the outlay may have been necessary because the unit was heavily loaded in the fall of 1944. In addition, the need for maintenance is in part the result of factors which operate at unpredictable intervals, such as storms, floods, fires, accidents, and breakage.

Statistical analysis of maintenance costs using the available data is, therefore, of little value. It appears to be the consensus among engineers that some decline in maintenance costs occurs as the size of units increases, but the extent of the decline is not known. Data on median cost per kilowatt for maintenance for stations in different size groups are included in Table III, for what they are worth.

Other Costs of Production. Central stations also incur costs for supervision and "supplies and expenses," and may incur costs for water, and for rent. All of these outlays are ordinarily unimportant, relatively. Supervision cost, the largest item in this group, behaves in about the same manner as cost of labor. It amounts to 18 cents per kilowatt per year for typical stations of 100,000 kw. or more, while supplies and expenses amount to 16 cents (See Table III). The median cost for water was only .04 mill per kilowatt-hour.

TABLE III—RELATION BETWEEN SIZE OF PLANT AND COST OF PRODUCTION, SHOWING RANGE OF COST AND MEDIAN COST OF DIFFERENT ITEMS BY SIZE OF PLANT

ITEM	Size of Plant		
	Group I 5,000-24,000 kw.	Group II 25,000-99,000 kw.	Group III 100,000-358,000 kw.
Fuel (B.t.u. /kwh at 50% plant factor).....	14,300-28,000 Md 19,800 n-24	12,500-25,100 Md 16,500 n-24	11,700-22,700(17,400)* Md 13,400 n-24
Labor (cost /kw. for bituminous burning stations, plant factor over 10%).....	\$2.34-\$5.89 Md \$4.41 n-15	\$1.29-\$2.56 Md \$2.10 n-13	\$.86-\$2.89 Md \$1.92 n-10
Supervision (cost /kw. for stations with plant factors over 10%)....	\$.10-\$1.15 Md \$.37 n-29	\$.11-\$.78 Md \$.24 n-24	\$.13-\$.57 (\$.32)* Md \$.18 n-15
Maintenance (cost per kw.).....	\$.52-\$6.96 Md \$2.03 n-45	\$.34-\$3.69 Md \$1.84 n-29	\$.53-\$5.19 (\$3.31)* Md \$2.06 n-14
Supplies and expenses (cost per kw.)	\$.03-\$.87 Md \$.25 n-45	\$.08-\$.86 Md \$.20 n-29	\$.07-\$.20 Md \$.16 n-14
Adjusted total production cost (mills /kwh).....	3.2-7.7 Md 5.0 n-24	3.2-5.9 Md 3.9 n-23	2.5-5.8 Md 3.5 n-14
Adjusted total cost per kwh (in mills).....	6.1-12.7 (10.2)* Md 8.0 n-24	5.6-8.6 Md 6.6 n-23	4.7-9.3 (8.4)* Md 6.4 n-14
Adjusted total cost per kwh omitting stations with five or more generators (in mills).....	6.1-12.7 (10.2)* Md 8.1 n-22	5.6-8.6 Md 6.6 n-21	4.7-6.8 Md 5.6 n-9

* The figures in parentheses indicate the value for the station with the second highest cost. Shown only where the difference between the two highest cost stations is marked.

Only 28 of 90 stations reported any outlay at all for rent.

Total Production Cost. All the available evidence indicates that adjusted²⁰ total production cost at 50% plant factor tends

²⁰ The method of adjusting fuel costs to 50% plant factor has already been discussed. Note that it eliminates the most inefficient stations. Supervision, labor, rent, supplies and expenses, and maintenance were taken as fixed costs, but water was considered as a constant variable cost.

to fall at a decreasing rate as size of station increases. The range of variation, however, is wide. The decline in total production cost can be traced principally to the influence of fuel costs. At 18 cents per million B.t.u. the median adjusted fuel cost of the small stations is 1.2 mills per kilowatt-hour more than that of the large stations.

Total Cost per Kilowatt Hour. A scatter diagram showing adjusted total cost per kilowatt-hour for 61 stations appears as Graph IV, and the statistics are summarized in Table III.²¹ Stations entirely built between 1932 and 1945 are indicated on Graph IV since improvements in design seem to have led to some decline in costs by comparison with the older stations. Several of the high cost older stations contain larger numbers of small units than would now be used; therefore, stations with five or more units are indicated. Even taking these factors into account, the data show a wide variation in costs among stations of the same capacity as well as a general tendency for costs to decline at a decreasing rate as size increases.

IV. Conclusions

This investigation commenced with the objective of learning something about the relation between size and cost, other factors being held constant. The costs of generating stations are influenced by so many variables with such complex interrelations that it is not now possible to write a mathematical relation between size and cost. At the risk of some repetition it is possible to answer, or partially answer, several questions about the costs of steam stations in such a way as to shed some light on the relation.

What variables influence costs of generation? Each of the following variables can account for a substantial difference in cost per kilowatt-hour between two stations:

price of fuel
fixed charge rate
price levels for construction of building and purchase of equipment
price of land

foundation conditions
accessibility of condenser water
method of fuel delivery
period of storage of fuel
plant factor
variability of load
reliability of performance required
temperature and pressure of steam
type and quality of fuel
state of the art
quality of engineering (in design, construction, and operation)
capacity and number of turbo-generators and boilers

The above list is by no means exhaustive, but it does include all of the variables which, in the author's judgment, account for an appreciable part of the differences shown, say, in Graph IV. There are, of course, complex interrelationships among these variables.

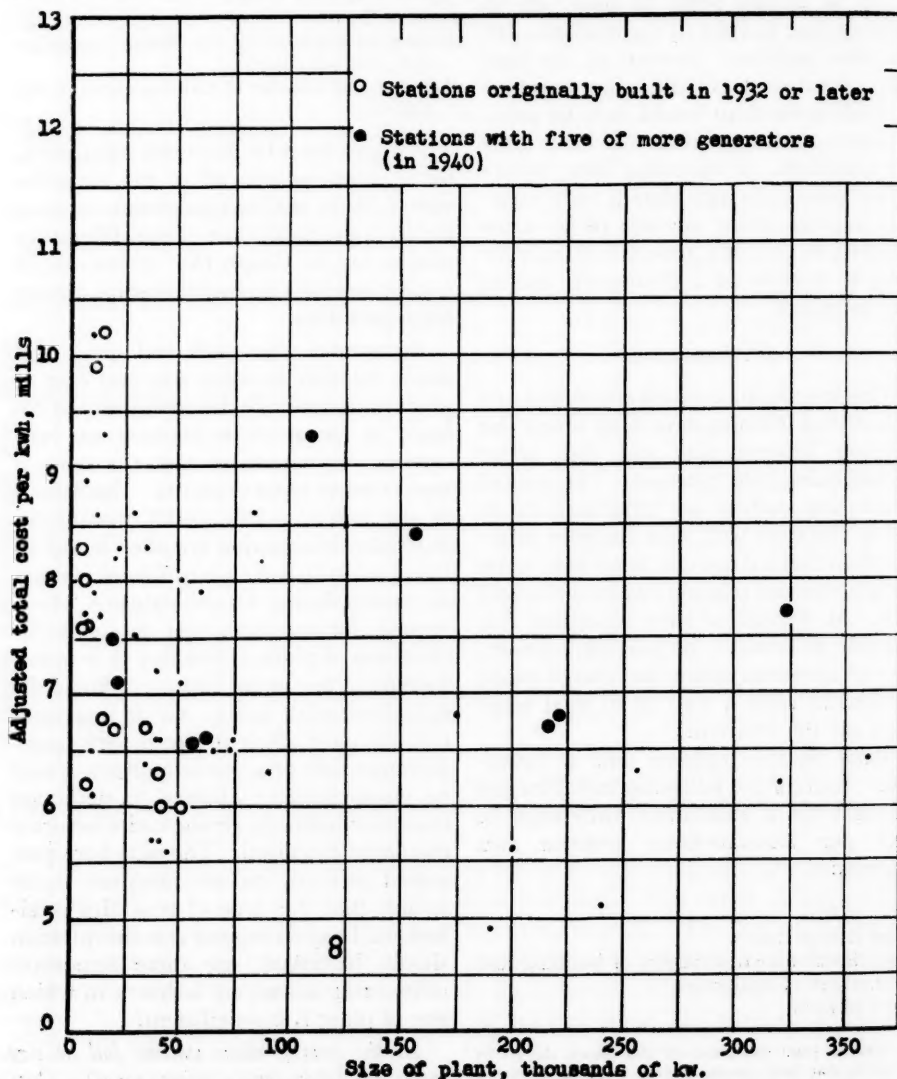
Economists who think and speak of a single relation between size and cost of plant underestimate the complexity of the facts, as far as steam stations are concerned. It is possible that the same is true of other types of plants. Discussions of the proper public policy toward industrial concentration are often based on the opinion that a certain size of plant is *the* most efficient for an industry. It is argued, for example, that *the* most efficient size of plant in industry A is small, therefore, the entire industry should be split into small units. Or it is argued that *the* most efficient size is very large, therefore, one or a few large firms should be encouraged or allowed to dominate the entire industry, or the entire industry should be socialized. The data here presented certainly are not adequate to establish that this type of reasoning is fallacious. They do suggest that the question should be asked, are there important differences *within* an industry in which size of plant is most efficient?

Do the costs of steam stations fall as size increases, other things being equal? Cost of plant per kilowatt falls because,

²¹ Cost of plant was converted into annual charges by assuming that fixed charges amount to 12.5% of cost of plant each year. The items included in fixed charges are depreciation, interest, taxes, and insurance.

first, the cost of individual units of equipment declines as their capacity increases, and second, the capacity of certain items need not be increased in proportion as the number of turbo-generators increase. Savings from both of these sources accrue at a decreasing

rate. As for production costs, fuel costs tend to fall because larger units are better adapted to higher temperatures and pressures and because fuel-saving equipment is more likely to pay its way in large installations. Labor costs fall because the working force does not need



Graph IV—Relation between size of plant and adjusted total cost per kilowatt-hour. Assumptions: fixed charge rate, 12.5%; plant factor, 50%; fuel, 18c per million B.t.u.; maintenance a fixed outlay. Number of stations shown: 61.

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to be increased in proportion to the capacity of the units they operate. One can safely infer that, as one proceeds from the smallest to larger stations, costs tend to fall—other things being equal—and that they fall at a decreasing rate.

Do costs rise as stations become indefinitely large? Under ideal conditions, costs would not rise with increasing size, at least not until capacity became larger than any actual or proposed station. Under actual conditions, there are several factors one or more of which may cause an increase.

First, and most important, the maximum size of station which can be built economically at a given site depends on the quantity of condenser water available. Steam power stations run fantastic quantities of water through their condensers. The 80,000 kilowatt unit mentioned above requires 93,500 gallons of river water per minute. That figure may be more meaningful in the light of data on the minimum flow of certain northeastern rivers, chosen at random, for the year October 1938 to September 1939, also chosen at random.²²

Of course, the minimum flow at some of these points could have been increased using existing facilities, but evidently only by some degree of interference with other uses of water, which implies an increase in cost.

The water cannot be run through the condenser twice without loss of efficiency since the water emerges with its temperature raised and the efficiency of the condenser depends on the cooling effect of the water. Cooling ponds can be built, but only at substantial expense. Even stations located on arms of the ocean may be limited in capacity by the volume of tidal flow past their intake tunnels.

Second, if a station serves a local load, its electrical system tends to become increasingly complex as the number of distribution circuits connected to the plant increases. Stations which send all their current over transmission lines do not encounter this problem.

Third, it may not be possible to increase the area of the site of an existing station, except at great trouble and expense. Fortunately, as loads have increased, progress in the art has increased

River	Place	Number of Units Using 93,500 Gallons per Minute Which Could be Operated on Minimum Day	
		Average Flow on Minimum Day (gallons per minute)	
Connecticut	Turners Falls, Mass.	285,000.....	3.0
Mohawk	Cohoes, N. Y.	62,000.....	0.7
Susquehanna	Wilkes Barre, Pennsylvania	280,000.....	3.0
Potomac	Point of Rocks, Maryland	500,000.....	5.3

the capacity which can be installed in a given area, but there are still limitations, particularly on what can be done without any increase in cost per kilowatt.

Fourth, when the generating units in the system are concentrated in one sta-

tion, the possibility of a complete interruption of service from earthquake, flood, or enemy action in wartime is increased. An insurance premium for such risks theoretically should be included in costs whether or not the risk is assumed by an underwriter. (A business man no doubt would include such premiums in account-

²² Source: Geological Water Supply Paper 871, U.S. Department of the Interior, *Surface Water Supply of the United States, 1939, Part I, North Atlantic Slope Basins*.

ing reports only if they represented an actual cash outlay.)

Fifth, as the volume of flue-gases emitted from a station increases, their dispersal becomes more difficult. The problem can be greatly reduced by the installation of smoke-cleaning equipment, but such equipment represents an expense. (On sites where the smallest station would be fitted with such equipment the cost ceases to represent a diseconomy of scale, of course.)

To generalize from these data, as the capacity of a plant is increased, diseconomies of scale may result from the following: (1) increased demands on the physical site; (2) increased risk of interruption of production from the concentration of facilities at one point; (3) increased complexity of the plant where the

several separate components must be tied together.

There is always a temptation to speculate as to the net effect on costs of building very large stations, say over 500,000 kw. Where there is sufficient water there is nothing in the forces analyzed in this article to suggest either dramatic economies or diseconomies of scale as capacity enters this range. Spectacularly different methods of producing steam might lead to a spectacularly different relation between size and cost.²³ At present, however, the principal economies of sale can be realized by much smaller stations.

²³ The author risked some observations on the probable effect of using atomic fuel in an article in collaboration with Walter Isard, "Comparisons of Power Cost for Atomic and Conventional Steam Engines," *The Review of Economics and Statistics*, August 1949, pp. 217-225.

II—Welfare Theory, Technological Change and Public Utility Investment†

By YALE BROZEN*

THE problem of setting rate schedules that will conform to the weak welfare principle is considerably complicated by the occurrence of technological change. Not only is schedule-making made difficult, but also the choice of the proper production function (proper proportion between variable, semi-variable, and fixed factors) to minimize cost of operation. Particularly is this the case when technology does not change at an even and predictable rate, with the consequence that obsolescence charges must be based on crude estimates which may later prove too large or too small.

In the following analysis of these problems, simplifying assumptions are made to give the exposition greater ease. Since the assumptions can be dropped without changing the nature of the conclusions, they are not vitiating.

The first assumption is that a new technique can be applied only by using a new type of equipment. A second assumption is that the average total unit cost of service, when using the new technique, is less than the average variable cost of operating with the old. To make the new equipment worth using, at least in preference to purchasing new equipment of the old type, it is sufficient to assume that the new technique has a lower average cost than the old. It simplifies the presentation, however, to use the more drastic premise. Thirdly, it is assumed the old technique is embodied in only one type of equipment of given durability and capacity, and that the durability is long and capacity is

large relative to the time periods and rates of production under discussion. Finally, it is assumed that the quality of service, using either the new or old technique, or younger or older equipment of the old type, is the same. Some modifications of these assumptions will be made as we proceed.

Rate Policy Appropriate After A New Technique Becomes Available

The appropriate rate and investment policy after the appearance of a new technique is one which minimizes the waste of sunk capital without unduly restricting or promoting the introduction of the innovation. Since average cost when operating with the new equipment is less than the average variable cost of operating old equipment, under the assumptions used here, the new equipment should be introduced as quickly as possible. The only limitation is the marginal cost of the equipment producing industry. It should extend its operations up to the point where the *extra* cost of *more* new equipment is so great that the average cost¹ of the product produced with the new equipment would exceed the average variable cost of continuing with the old equipment.

It is possible that the demand for new-type equipment by other users will be so great, and the suppliers of the equipment so unwilling to expand their capacity, that a long period may elapse before such apparatus can be obtained at a low

¹ Average cost in the early life of new-type equipment will usually be inflated by large depreciation charges caused by the decline in value of the equipment resulting from the fall in its price as the supply becomes larger. See Y. Brozen, "Invention, Innovation, and Imitation," *American Economic Review*, May 1951, for a fuller analysis of this point.

† Part I appeared in the February 1951 issue of this journal.
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enough price to make it worthwhile to a particular operator. If the period is long enough, the rise in variable costs may more than consume any saving of capital cost made by avoiding investment in new pieces of old-type apparatus for the interim. American Gas and Electric Company, for example, reported that it bought inferior equipment in 1947 and 1948 rather than wait for the best equipment (or offer a high enough price to get it). Otherwise, it would have been forced to operate old equipment normally kept on a stand-by basis or push the operation of its equipment much beyond its minimum cost rate.²

The rate of introduction suggested above will occur as long as any old equipment of excess average variable cost remains to be replaced, assuming utility commissions do not penalize firms by a greater disallowance of sunk capital not recovered by the time new equipment is ready than would be disallowed if new equipment were not purchased.³ Once all the old equipment is replaced, then further introduction of new equipment will depend upon expansion of the market through a reduction of rates. Investment in new equipment should increase until the industry arrives at its new rate schedule and the appropriate total investment to satisfy with minimum cost the rate of demand generated by the new rate schedule.

² "Utility President Looks at the Future," *Business Week*, April 23, 1949.

³ E. Troxel, in his "Economic Influences of Obsolescence," *American Economic Review*, June 1936, p. 284, points out that "since effectively regulated companies, such as public utilities, have their cost of service, which includes a 'fair' rate of return on the 'fair' value, equalled by commission-approved rates, there may be a tendency for these industries to delay indefinitely the introduction of cost-reducing improvements. If the state or federal commissions require a rate reduction every time a lessening of the unit cost is achieved, the utilities customarily will refuse to make these improvements. If the consumers instead of the companies receive all gains from these reductions of cost, the anticipated gains will be devoid of any advantages for the regulated companies."

The final rate schedule should not be put into effect immediately upon appearance of the new technique nor upon the replacement of the old equipment. To do so would remove the incentive to operate the equipment industry beyond its capacity and would result in a slower rate of introduction of the new devices. As new apparatus replaces old, much of it will be acquired at prices above the long-run equilibrium level and will be operated at above capacity rates until new capacity equals the old (assuming stable demand conditions). At this point, capacity rate of operation will satisfy the market, but rates will be above the average cost of operating the new-type capacity. The average cost of operating the new-type capacity during the period culminating with complete replacement will be above long-run, minimum, average cost. This is the result of (1) the above-capacity rate of operation during this period, which means that equipment has been operated at a point on the rising portion of the short-run average cost curve, and (2) the inclusion in economic cost of production (if not in the accounting computation of cost) in this period of the portion of equipment cost which is above the long-run equilibrium price for equipment.

The lowering of rate schedules should begin as firms find it possible to add to their old capacity new equipment at prices which will result in lower marginal and average cost, although cost is still inflated by excessive cost of new capacity and by rapid writing off of the excessive portion.⁴ However, the amount of inflation in cost will decline as depreciation costs are reduced with the reduction in the above equilibrium price of equipment to the equilibrium level.

⁴ It is interesting to note that this method of cost assignment has been allowed the Chrysler Corporation by the Bureau of Internal Revenue for purposes of computing its income. S. Y. McMullen, "Depreciation and High Costs: The Emerging Pattern," *Journal of Accountancy*, October 1949, pp. 305-6.

At all times the rate of return should be kept high enough to induce an inflow of investment to the industry at the maximum rate. The rate of inflow will be limited on the one side by the amount of demand and, on the other, by the marginal cost pattern of the equipment supplying industry. By the time the utility industry arrives at its new long-run equilibrium, all excess cost of new equipment (excess above the price at which it is available in the new long-run equilibrium) should be written off, since it is properly chargeable to the haste with which the industry was trying to escape its old variable costs and the haste with which it was trying to increase the supply of services.⁵ Those who benefited from the extra services made available by such haste should pay for them.

It might be argued that the new equilibrium was reached more quickly because of the purchase of high priced new equipment and that some of the extra charge should be made after arriving at the equilibrium. This in itself, however, prevents the arrival of the equilibrium and, therefore, should be disposed of as rapidly as is compatible with equity to the investors in the utility and maximum rapidity of expansion. The nature of the appropriate rate schedule will emerge further in the discussion that follows of the policy appropriate *before* the appearance of a new development.

Rate Policy Preceding the Appearance of New Techniques Assuming an Abundance of Old Type Equipment

In examining rate policies appropriate to a period preceding the availability of

an expected new production process,⁶ it is helpful to separate the problem into two parts. First, an industry sufficiently equipped to carry it past the appearance of the innovation will be considered. Then an industry insufficiently equipped to fall into this category will be considered.

Although an industry may be equipped to carry past a given point in time with its ordinary rate of operation, there are different degrees to which this may be true. It may (1) have just enough equipment to get past this point, (2) have far more than enough equipment to get past this point not only at ordinary rates of operation, but even with the accelerated rates resulting from the pricing policy about to be described, or (3) have enough to get somewhat past the point in question at ordinary rates of operation, but not enough to operate at the accelerated rates described as appropriate for case (2) and get past this point.

Case One: Just Enough Equipment. Suppose, then, that old equipment will remain usable until slightly past the point that new equipment is ready to go into operation. That is, the average cost of operating marginal items of old equipment will just rise to equality with the average cost of new equipment of old type (allowed to live out its usual life span) at the time equipment of the new type is ready. In this instance, no acceleration of present rates of operation

⁵ In the following discussion, certainty is assumed. It is not wholly unrealistic to assume certainty for the time period relevant to making some varieties of investment decisions. Usually, it takes several years to perfect equipment after pilot models are built. The builders of the Rover gas-turbine automobile, for example, have announced that it will not be marketed for three years because of the necessity of additional design work. As W. F. Ogburn points out, "some time elapses before the full effects of an invention are worked out. The time element furnishes an opportunity of studying and forecasting what the social consequences may be." "National Policy and Technology," *Technological Trends and National Policy*, National Resources Committee (Washington: Superintendent of Documents, 1937), p. 11.

⁶ The approach to a long-run equilibrium after the development of new technique requiring new durable equipment is a problem in dynamics which cannot be discussed in full here. A more complete analysis may be found in Y. Brozen, "The Dynamics of Technological Change," *Some Economic Aspects of Technological Change* (unpublished doctoral dissertation deposited in The University of Chicago Library, 1942).

is desirable, assuming that rates were already properly set on the assumption of no technological change. Price schedules should be left unchanged.

Case Two: Over-Abundant Equipment. Let us turn now to an industry equipped sufficiently to carry it far past the point of appearance of new techniques. Prices must be set which will result in operation at the rate at which marginal cost is equal to price, but marginal cost will be changed by the prospect of improved techniques. No future return is sacrificed, or extra variable services required in the future, because of present operation of equipment. Therefore, the marginal cost used for rate-making in the present case should not include any depreciation⁷ resulting from use.

The rate *schedule* must be set in a manner such that firms recover their whole investment, exclusive of scrap value (that is, the whole investment in equipment which will be made obsolete by the new techniques), by the time the

equipment embodying the new technique is ready to substitute for the old. This does not imply a rate which equals average cost including accelerated depreciation but, rather, an *average* rate that does this with rates at the margin no greater than marginal cost *excluding any depreciation*.

Marginal rates should be lower than rates that are correctly set when no technological change is anticipated. Future revenue is no longer sacrificed by operating and wearing out equipment now instead of having it available in the future. Future prices will be too low to yield any excess over variable cost. Therefore, marginal cost is now lower by the removal of all depreciation cost,⁸ although average cost is higher now than anticipated because of accelerated depreciation⁹ of a type that is independent of the rate of use of equipment. Rate-setting on the basis suggested here will lead to the best possible use of sunk capital, assuming that the higher average rate does not inhibit the increased use induced by lower marginal rates.¹⁰

⁷ See J. M. Keynes, *The General Theory of Employment, Interest, and Money* (New York: Harcourt, Brace and Co., 1936), pp. 69-73, for an analysis of the effect of future returns on the computation of depreciation.

⁸ See J. Bain, "Depression Pricing and the Depreciation Function," *Quarterly Journal of Economics*, August 1937, pp. 705-15, for a discussion of the influence of depreciation on marginal costs.

⁹ The objection has been raised that neither utility commissions nor management can be expected to readjust depreciation charges frequently. The following statement from R. Winfrey, "Use and Misuse of Retirement Data in Estimating Depreciation," *Proceedings of the Midwest Power Conference*, IX (Chicago: Illinois Institute of Technology, 1947), answers this criticism: "Why management is desirous of placing an unchangeable depreciation rate on the property of its several accounts is not obvious. Its accounting department deals with no other financial factors that remain constant. Prices for materials, labor, equipment, services, and sales change day by day. Taxes, profits, interest rates, and insurance rates likewise undergo continuous change. What valid objections then can be advanced to the changing of depreciation rates? None in reality, for depreciation is just another item of the cost of production of goods, or services, and it must vary with alterations of conditions and policies, under which the goods or services are produced. But it is unwise to change depreciation rates too frequently; they should be changed only when the facts indicate that the average lives of the property have taken a definite and material change."

"It has been long argued whether depreciation takes place uniformly over the service life of depreciable property. In retrospect perhaps it does when based strictly on the passage of time. But currently, when looking to the future, it usually varies from year to year. The forces which cause ultimate retirement are not of constant pressure, though they are unyielding, with practically all classes of depreciable property used in business and industry, both functional and physical forces of retirement change in tune with production demands, management policies, growth and decay of the industry and economical and political outlooks. It is mere happenstance, then, that physical properties are retired in accordance with the forecasts made when they were new. Management and public taxing authorities should recognize this as the normal course of events and allow depreciation rates to be changed whenever reanalysis of the future indicates that the present depreciation rates are no longer applicable. The straight line method of estimating depreciation, when properly applied, does not result in equal annual charges for depreciation over the life of the property, but in unequal amounts in accordance with the current exercise of judgment in predicting the future. The sooner managements accept this as the normal behavior of depreciable properties, the sooner they can rid themselves of many depreciation worries." p. 32.

¹⁰ See C. G. F. Simkin, "Some Aspects and Generalizations of the Theory of Discrimination," *The Review of Economic Studies*, 1947-48, for a discussion of the relationship of systems of discriminatory pricing to rates of operation.

Case Three: An Intermediate Equipment Supply. Turning to the third case, there is plenty of equipment to carry past the point of installation of new equipment if old rates of operation were maintained, but not enough to carry past this point at the accelerated rates that would result if marginal prices were set on the basis of a marginal cost that took no account of depreciation resulting from use. Essentially, this implies that the marginal cost curves which include user cost begin moving upward because of the wearing out of equipment before the appearance of new-type equipment. Marginal prices then would have to be raised to prevent the industry from being forced to bid for variable services that are worth more elsewhere than in producing marginal services in this industry. In such a case, marginal rates should not be dropped to the level dictated by marginal costs excluding all depreciation; yet they should not be kept as high as they would be if no new developments were expected.

The average price will have to be higher than it would be if no innovations were expected in order to recapture all investment before the new technique is ready for installation. Otherwise, investment in new equipment may be hampered by the restricted rate of use of such equipment resulting from the higher average that would have to be charged to recoup unamortized old investment as well as current investment.

Here the point may be raised that a high average price now restricts the use of equipment in which the cost is already a by-gone (any future returns already being knocked out by the prospect of the new technique) and, therefore, it should not be done. We are assuming that a rate schedule can be devised which will carry the rate of use out to the economic point. If it cannot, then we must come as close to that ideal as possible while

minimizing the loading of any losses onto future rate schedules for new equipment.¹¹

Ordinarily, as was argued above, the loss of sunk capital should be borne by investors since the loss is due not to the new technique, but to the failure to foresee the new technique and the consequent over-investment (and also perhaps, under-use of available equipment). In order to motivate better investment judgment, losses must fall on those who make mistakes in judgment. In the case of public utilities, however, judgments are made by regulatory commissions in the rate schedules they permit or set. Since the investment loss does not penalize public commissioners, we cannot argue for letting the loss occur, unless it can be demonstrated that the utilities failed to petition for proper allowances and permission to use policies designed to minimize such losses. The latter approach is difficult to use since utility investors or officers can readily protect themselves by presenting such petitions regularly as a safeguard even when prospects of new developments are dim. To the extent that utility commissions would at least be specifically asked to take such prospects into account in making their decisions, this policy would be advantageous.

To return to the previous point of avoiding any loading of the cost of sunk capital onto the rate schedules set for new equipment, the first problem for consideration is whether a present average rate *can* be set high enough to return all capital by the time the new technique appears without preventing economic use of present equipment. If it can, there is no problem. If it cannot, then

¹¹ "... to count the loss . . . , in respect of any unit taken over . . . by the new machinery, as a part of the social cost of producing that unit would be incorrect." A. C. Pigou, *op. cit.*, p. 189.

should rates be set which will result in optimum use of present equipment and leave a minimum of sunk capital costs to be paid in the future, or should all sunk capital be recaptured, if possible, from the beneficiaries of present equipment?

Insofar as future rate schedules can be devised which return the sunk capital and still permit optimum use of capital in the future and of investment in the new equipment, it might be argued that optimum use of present equipment should not be prevented by an overly steep average rate. From the point of view of the distributive implication of the weak welfare principle, however, it might be argued that future users are taxed by this method for the benefit of present users and that this should not be done.¹² Future schedules may be devised, perhaps, which do not cause reallocation of productive agents to inferior uses and thus avoid any "non-revenue yielding" burden but the income effect will certainly be present.

Actually, no future rate schedule can be devised, it seems to us, which will not have some effect on the future allocation of resources. To the extent that the average cost of transportation or power

is higher to the future user, despite appropriately low marginal rates, the costs to future users will be higher and industries using such services less attractive to entrepreneurs and investors. Under-expansion of these industries would certainly result. To the extent that future users benefit through earlier application of new techniques by recovering sunk costs in this way, however, these industries are not restricted in comparison with their position in the absence of early introduction of improvements.

Since present users are less able to adapt to higher average rates than future users (because present users cannot readily free their capital from specialized forms), a higher average rate in the present will not cause serious misallocation as long as low marginal rates are maintained. As far as possible, then, sunk capital costs must be loaded onto present base rates. The antipromotional effects can be offset by making known the prospect of cheaper future cost. Capital can be freed from its present specialized forms and move into new uses, then, at the appropriate time.

Rate Policy Preceding the Appearance of a New Technique Assuming a Scarcity of Old Type Equipment

Suppose, now, that the industry is insufficiently equipped to carry it up to the point where new-type equipment is ready to come into operation. Rates could be raised enough to cut the use of equipment and make it last until the new equipment is ready. Whether this is appropriate, or the extent to which it is appropriate, depends upon particular circumstances which require examination.

Case One: Enough Old Equipment. Three cases of insufficiency may be distinguished. One is that in which enough equipment is new enough to last until (wear out at) the time at which new-type

¹² The usual argument that the future cannot be taxed for the benefit of the present made in the case of war finance does not apply here. Our concern is with the fact that future rate schedules may be set in a manner such that less desirable services are produced from the resources of the future than would be produced if the schedule were set differently. Insofar as the future rate schedule is distorted for the purpose of forcing saving in order to return capital lost by mistakes in past or present decisions, future consumers are taxed for the benefit at the future time of past investors. If the choice is to tax present consumers for the benefit of past investors, more capital is made available for the future. Past investors who want their capital intact at a future time may have it returned to them by a pricing method which takes from the income of present consumers or from that of future consumers. There is a real choice as to whether a group of future or present consumers are to be forced to do with less than they otherwise would have, not only from the same point of view as that involved in making a country's future population pay present war costs by the use of external debt, but also in the sense of whether more or less capital resources will be provided for the future by the present generation.

equipment will be ready. That is, the average variable cost of operating with the old equipment will become equal, at this time, to the average total unit cost (computed by assuming the life and rate of operation it would have in the absence of change) of operating with new equipment of old type. The solution of this case is the same as in that already discussed in which equipment is new enough to last slightly past the point of availability of new-type machines.

Case Two: Almost Enough Old Equipment. The second case of insufficient old equipment is that in which the interval between the wearing out of old apparatus and the time at which the new-type can be installed is so short that it does not pay to buy new pieces of old-type equipment. It may be defined as an interval so short that the total cost of operating old-type apparatus purchased new for the interval in question would exceed the total cost of continuing with the old, despite the fact that the old is worn out. In this case, the old equipment should be continued in use for the interval involved. Rates should be set high enough to restrain the use of services to the diminished rate dictated by the higher intersection of marginal cost and demand curves.

This brings up two questions. The first has to do with the fact that the higher value of services arising out of the increased price and diminished rate of supply in the interim period reflects back into the marginal cost of operating the old equipment when it was still short of the worn-out point. Part of the marginal cost of operating equipment now is the discounted value of the future quasi-rents sacrificed by wearing out equipment now instead of having it available for future use. Hence increased marginal cost dictates higher marginal rates before the equipment

wears out. This will restrict its use, save some of it for the interim period, and reduce the level of marginal rates in the interim period.

The second question has to do with the average revenue resulting from the rate schedule used. It is likely, under the circumstances resulting from the treatment of fixed equipment suggested here, that marginal cost will intersect demand above average cost (as determined by net original investment). It would seem simple enough to dictate a rate schedule providing high enough rates for marginal services to restrict sufficiently present use of equipment. Difficulties lie in the way, however, of determining which are the marginal units whose price is to be high.

To take an example, suppose that a box car of freight service of given type has the same marginal cost as any other car, considering each as marginal to the rest in each instance. Such might be the case if terminal or switching service were billed separately from transport between terminals. Considering only cross-country transport, more might be charged for the fourth, fifth, sixth, and seventh car each month than for the first three, using a block-rate schedule. Suppose that the intersection of MC and D takes place at \$100 per box car, and that average cost is \$90 per car, at a rate of production of freight service which allows the average shipper to send six cars a month. The schedule might be geared to this average user who now ships, say, seven cars a month. By raising the rate to \$100 for cars over three a month (while charging only \$80 each for the first three), he may be persuaded to rearrange his packing and shipping methods, switching part of his shipment to other transport means, rearrange his sales territory and, perhaps,

even redesign his product to cut his rate of demand to six cars a month.

Difficulty arises from the fact that this rate schedule permits a small user to whom a second car a month is worth only \$80, or slightly more, to ship it. His marginal carload is not prevented from utilizing services worth \$100 elsewhere, despite its being worth only \$80 in this use. A block schedule also unduly penalizes the large shipper whose marginal car is his fifteenth or twentieth. He, in a sense, is subsidizing the small shipper by paying a price above average cost for his shipments, thus making it possible for the small shipper to get a price below average cost.

A further difficulty arises in the case of the shipper who may choose among several railroads. When he runs through his first block with one, he may start a first block with another rather than pay a higher price for the second block.

The difficulties of properly applying *ascending* block rates to given types of transportation service, such as railroads, seem too great to justify this pricing method for rationing the service and preventing overuse of equipment. On the other hand, a uniform rate equal to a marginal cost in excess of average cost is objectionable on the ground that it encourages underinvestment.¹³ Also, it is objectionable to shippers who do not wish to see a greater return going to railroads than is necessary to maintain the service they desire. Some elaborate scheme of taxing surplus profits and refunding to those able to meet certain tests also is objectionable on grounds of inability to discriminate properly between the marginal uses of large users and those of small users, except on the basis of historical tests which do

not meet the need of making our economy adapt properly to changing conditions. The only recourse in this case seems to be to allow a price in excess of average cost and impose a franchise tax designed to absorb surplus profits. Alternatively, price could be kept equal to average cost and an excise tax imposed, such as that used on freight and passenger service and on telephone service in recent years, to be added to the bill sent to the user. These, however, must be recognized as temporary expedients and must not be allowed to become a permanent part of the state revenue system.

Case Three: Very Insufficient Amounts of Old Equipment. The third case is that in which the time interval between the wearing out of old equipment and the introduction of new is sufficiently long to allow the purchase of new equipment of the old type for the interim period. Three sub-cases may be distinguished. The simplest is that in which the interim is just long enough to allow the new items to wear out, in the sense previously indicated, by the time the new process is ready to operate. This presents no unusual problem.

The second subtype is one in which the interim is a little too long to meet the test for falling into the preceding subtype. Then both present equipment and the new equipment of the old type purchased for the interim must be stretched in the manner already indicated by raising marginal rates and reducing the rate of wear and tear from operation.

The third subtype is that in which the interim is a little too short to permit the full utilization of new equipment of the old type, yet long enough that the rise in variable cost of continuing old equipment through the period would absorb any saving made by refraining from purchase of new, old-type equipment. In this subtype, then, marginal rates must

¹³ E. Troxel, "Limitations of the Incremental Cost Patterns of Pricing," *Journal of Land & Public Utility Economics*, February 1943, p. 34.

be lowered, compared to what they otherwise would be, in order to extract as much economic use as possible from the two sets of equipment, although this *may* require a rise in the average rate to return all the investors' capital together with normal earnings.

Problems raised by circumstances of this sort confronted the Illinois Commerce Commission in the telephone industry in 1949. It was asked to allow high depreciation allowances for manual switchboard equipment installed to serve telephone subscribers who otherwise would have to wait for the installation of dial equipment. The Illinois Bell Telephone Company had undergone large increases in its maintenance and traffic expenses as a result of pushing old equipment beyond its usual capacity and usual life. Order backlogs were still so large that it installed new manual equipment rather than postpone filling orders until the dial construction and equipment program would make it possible to meet demand. Normally, manual equipment was depreciated over a thirty-year period. Because of the expectation that the new manual boards would be replaced by dial equipment as it became available, permission was asked to depreciate the boards over a seven year interval and to raise rates accordingly.¹⁴ The Commission found depreciation expense computed in this way to be reasonable.¹⁵

Modifications Introduced By Altering the Original Assumptions

In the preceding cases, we have assumed only one type of equipment available in fairly large units, leading to indivisibility in the capacity sense, and of one durability, leading to indivisibility in the length of capital commitment sense.

Neither indivisibility is completely rigid. The length of time of capital commitment can be shortened by more rapid rates of operation, although it cannot be shortened at will in a constant cost sense. The capacity of equipment (defined by the minimum cost point) changes with movements in depreciation charges. (Depreciation due to wear and tear, which is a variable cost, is changed into depreciation due to obsolescence, which is a fixed charge, by the occurrence of technical advance. If the fixed charge is larger than the variable charge would have been at the old capacity computed in the absence of change, the minimum cost rate of operation is higher.) The conclusions drawn above remain valid, however, if the short-run average cost curve of a utility is U-shaped.

If equipment comes in various capacities and if equipment of different durabilities is available, more perfect adaptation can be made to the prospective appearance of a new technique. The more nearly the same the average cost of operating capital items of different capacities and durabilities, the less the responsibility the regulatory authorities must bear for making it possible for a utility to recapture its capital in the face of technical changes.

If there are possibilities of alternative uses for old-type equipment which will be little affected by the availability of apparatus embodying the new technique, adaptation can be more perfect and regulatory responsibility reduced.¹⁶ An example of such a situation is the prospective development of atomic-energy-driven locomotives. Their capacity is likely to be in excess of 6000 horsepower, as far as can be forecast on the basis of available

¹⁴ Illinois Commerce Commission Consolidated Cases No. 58370, 58388, and 58461, abstract pp. 290-350.

¹⁵ *Ibid.*, pp. 1508-1509.

¹⁶ G. Terborgh discusses "degradation" of equipment, that is, its movement through various uses as better equipment becomes available, in his *Dynamic Equipment Policy* (New York: McGraw-Hill, 1949), pp. 17-245.

information.¹⁷ If this holds, then multiple-unit diesels now used for heavy service can continue in use, after new heavy service atomic locomotives become available, by putting individual diesel units in light service. If railroads continue to buy non-adaptable, heavy power units to meet their service requirement, the Interstate Commerce Commission need not be tender toward investors in such obsolete equipment, if it does become obsolete, when it remakes rates to meet changed technological circumstances.

Problems relating to uncertainty in the timing of the appearance of new techniques may be handled by designing equipment for multiple purposes or by designing it for short durability or optional durabilities. The latter is often done by choosing low first-cost apparatus which requires frequent major overhauls

instead of high first-cost apparatus which entails little maintenance. All this is done at a cost, however.

Insofar as public utilities can adapt the proportion of fixed and variable production factors, or the proportion of long-lived and short-lived equipment, without the permission of commissions, they are free to adapt to the possibility of coming technical changes. If they fail to make the proper adaptations, then the responsibility is theirs. In such cases, regulatory authorities should fix rate schedules to protect investors only to the extent that the extra cost to consumers, resulting from the necessity of returning capital which does not actually give them more services than they would have had at the same cost without the capital items in question, is offset or more than offset by the lower rate of return required to attract capital resulting from the protection given to investors against the risk of technological change.

¹⁷ J. B. Condliffe, *et al.*, "Atomic Energy: Its Future in Power Production," *Chemical Engineering*, October 1946.

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Land or People?

By CHARLES M. HARDIN*

I. Reorganization of the Agricultural Conservation Programs Raises a Major Question

THE "agricultural resource conservation services" of the United States Department of Agriculture (USDA) were consolidated by Secretary Charles F. Brannan on February 16th, 1951. Following the declaration of purpose the Secretary's memorandum declares the "basic soil conservation objective"—that each acre shall be used within its capabilities and treated according to its needs for protection and improvement. The Assistant Secretary acquires "supervision and direction" of all departmental activities touching forests, lands, and water. He is charged to encourage and develop soil conservation districts and to supervise Departmental relationships with these and other relevant state and local agencies. Under his direction the Soil Conservation Service (SCS), the Production and Marketing Administration (PMA), and the Forest Service will jointly determine practices and payments respecting the Agricultural Conservation Program (ACP) of PMA.

State and county SCS and PMA offices are to be consolidated. The state PMA committees, the SCS State Conservationist, and the Forest Service official in charge of farm forestry shall jointly determine state soil conservation and related programs. County programs are to be formulated by county PMA committees, local SCS technicians, and soil conservation district supervisors. Presidents of the Land-Grant Colleges are invited to assign members to participate

at the state level and county agents are invited to participate locally. Farmers Home Administration officials also are invited to share in program formulation.¹

The February 15 order may be a significant milestone in the development of conservation policy. For fifteen years the USDA has operated two major action programs dealing with soil conservation problems on private lands—SCS and ACP of PMA (formerly the Agricultural Adjustment Administration). The two programs were combined after Pearl Harbor, but the union was short-lived. Secretary Anderson's reorganization committee, which set up the PMA in 1945, failed to unite SCS and ACP. In 1948, the Hope and Aiken Bills proposed diametrically opposite solutions to the problem, but neither was enacted. In 1948-49 the Task Force and Hoover Commission reports proposed a consolidation which bears only slight resemblance to the February 15 order. In 1950, President Truman's reorganization plan was killed in the Senate largely because it failed to specify what was to be done about ACP and SCS.

The February 15 order appears as a victory for PMA over SCS.² SCS regional offices are not mentioned, but no clear function remains for them. State

¹ Memorandum No. 1278, Office of the Secretary, United States Department of Agriculture, February 15, 1951; press release, Office of the Secretary, February 16, 1951.

² The writer draws this conclusion from reading the reorganization document. At the Chicago meeting, March 3, 1951, however, it was asserted that technical soil conservation methods are still to be administered by SCS, that SCS and ACP administrative lines are to be kept as they are, and that soil conservation districts are to be full partners in developing local conservation programs. The National Association of Soil Conservation Districts was reported as in full accord with the reorganization. One interviewee said that the order represents a "draw" between SCS and ACP. The Chicago meeting was one of four held to explain the series of reorganization memoranda.

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program formulation is to be achieved by conferences or other means "to be initiated by the Chairman of the State PMA Committee." Similar initiatory powers are vested at the county level in PMA chairmen. If technical phases of "permanent type" soil conservation work are to be directed by local SCS technicians, they are to receive "program guidance from the PMA County Committee in consultation and cooperation with the governing body of the Soil Conservation District."

This article, however, will not examine the gains and losses to the several administrative interests³ involved; rather it employs the February 15 order to raise the question—What should the aims of policy be?

2. The Problem

The Chief of the Division of Soil Survey, USDA, Charles E. Kellogg, has stated:⁴

"Generally, erosion is one of the symptoms of some deep maladjustments between the soil and the farming system. Rarely can we achieve control by simple direct means; rather we must get back of the immediate systems and find the cause. Frequently, we find weak plant cover and declining soil fertility resulting from unstable economic conditions, bad tenure relationships, overcrowded land, poverty, disease, and wars . . ."

The breadth of this statement is staggering. It implies that soil erosion and related problems can be approached with ultimate effectiveness only in light of comprehensive understanding of human nature, human relationships, non-human resources, and the relationships of human beings to such resources. No

such complete grasp of all facets of the problem as would provide criteria for judging present conservation programs is possible. Dr. Kellogg's challenge, however, enables us to ask whether erosion control and related programs should not be oriented toward a different goal than the "basic soil conservation objective" as stated by the Secretary. An alternative goal is proposed—the improvement of farm family living⁵ on a soil-conserving base. Without overlooking the significance of conservation, this orientation assumes that natural resource policy will be appraised in terms of human values.

The humanistic objective urges us to look to the conditions which bear upon improved farm family living. Much farm policy, it is assumed, roots back into decisions of the farm family—what enterprises to include and how much, whether to acquire more land, what division of farm income will be made among farm and home claims, etc. There is an implicit assumption that considerable farm and home planning either does or should take place. But is "rational" planning facilitated or hampered by land tenure? By the availability of credit? By attitudes toward credit? By the presence or absence of skills and managerial understanding?

The SCS employs the "complete farm plan," of course; and the ACP program has often attempted to fit its annual payments into some kind of plan for the farm. But neither approach is organized to consider the various conditions of tenure, credit, taxation, agricultural instability, or available skills and mana-

³ Agricultural extension, both federal and state, has important interests in the matter. These interests were significantly recognized in the Aiken Bill (1948) and in the Hoover Task Force Report for Agriculture (which would have transferred the bulk of SCS appropriations to extension, especially at the county level); the February 15th order carries no such recognition of extension.

⁴ Lecture, Graduate School, United States Department of Agriculture, November 15, 1948.

⁵ To assert improved farm family living as a goal in terms of this paper does not require analysis of the "family farm." The writer accepts T. W. Schultz' statement on the family farm in Chapter 5 of his *Production and Welfare of Agriculture* (New York: The Macmillan Company, 1949). Note especially that the family farm is not viewed "as an end of agricultural policy." Rather it is conceived "as an instrument through which agriculture and rural life can be made a rich and satisfying experience . . ." (p. 34).

gerial ability—conditions which in some combination often delineate the problem of improving farm family living on a conservation base. The February 15 memorandum proposes to accelerate and improve soil conservation on private land; but it fails to make the improvement of farm family living an explicit objective. No criticism is implied of Secretary Brannan who went about as far as he could go under the circumstances. Nevertheless, a radical redirection of objectives is strongly urged, to be followed by a program of implementation. Achievement of the redefined objectives presents no mean task, as following sections on tenure and credit show; actually, it is less difficult than the redefinition itself.⁶

3. Land Tenure and Soil Conservation Policy

Land tenure means more than "tenancy;" Max M. Tharp, for example, defines it as including "the various arrangements under which farmers or others hold or control land."⁷ This breadth is necessary if we are to consider the significance of tenure for conservation policy. History probably records no more complete private control of land than exists in the United States under the doctrine of "fee simple absolute."⁸ This doctrine has contributed to absentee ownership which in turn may lead to the exploitation of land for immediate gain, without regard for the soil.⁹ The doctrine of fee simple has also contributed indirectly to the conservation problem through its

effect upon inheritance. Ideally, farms are supposed to pay for themselves each generation. If an owner-operator dies intestate, for example, his heirs "may have no other alternative . . . than to rent the property to one of their number or to an outsider." In consequence, the primary purpose of vesting farm operation in farm owners is often lost, and the result is rather "to promote widespread ownership by non-farmers"—with a concomitant increase in tenant operation.¹⁰ Such transfers at death of owner may add to the mortgage load of the farm, with resultant motivation to exploit the soil to pay off the mortgage or with possible foreclosure and further transfer of landed property. The tendencies for able farmers and for non-farmers as well to acquire land either for operation or for leasing adds to the transfer.

"The net effect of this turnover is the increase of tenancy as the amount of good farm land that is open for purchase by new operators shrinks . . ."¹¹

That tenancy may contribute to soil depletion and erosion is well-recognized. Tenants in this country frequently have little incentive to conserve and improve the soil. Short term leases, lack of assurance that improvements will not be translated into higher rents, absence of guaranteed reimbursement for unexhausted improvements in the event the tenant moves—all these may lead to soil depletion.¹²

¹⁰ *Farm Tenancy*, *op. cit.*

¹¹ Leonard A. Salter, "Farm Property and Agricultural Policy," *Journal of Political Economy*, February 1943, p. 15.

¹² *Farm Tenancy*, *op. cit.*; Ackerman and Harris, *op. cit.*, pp. 412-13, and index; Max M. Tharp, *The Farm Tenure Situation in the Southeast*, South Carolina Agr. Expt. Sta. Bul. 370, Clemson, January 1948, p. 26; Marshall Harris, et. al., *Farm Tenure in Iowa v. Some Legal Aspects of Landlord-Tenant Relationships*, Iowa Agr. Expt. Sta. Bul. 371, Ames, April 1938, cf. pp. 15, 17-18, and the literature cited in n. 22, p. 18; J. Hoyle Southern, "Land Tenure and Soil Conservation," in Harold Hoffsommer, *Land Tenure in the Southwestern States*, (Chapel Hill: University of North Carolina Press, 1950).

⁶ As the concluding paragraphs of this paper indicate.

⁷ "A Reappraisal of Farm Tenure Research," *Land Economics*, November 1948, p. 316.

⁸ *Farm Tenancy*, Report of the President's Committee (1937), p. 39; Joseph Ackerman and Marshall Harris, eds., *Family Farm Policy* (University of Chicago Press, 1947), pp. 44 ff., H. W. Hannah, *Law on the Farm* (New York: The Macmillan Company, 1949), pp. 51 ff.

⁹ *Improving Farm Tenure in the Midwest: Problems and Recommendations*, Illinois Agr. Expt. Sta. Bul. 502, Urbana, June 1944, p. 159. Absentee ownership has developed without fee simple ownership, of course.

It is true that the tenancy situation eased in the 1940's; consequently, less attention appears to be accorded to it lately than is found in discussions of public policy during the 1930's. There has been some depreciation of the need for tenure research. But a number of analysts believe that tenurial maladjustments will once more plague agriculture in the United States.¹³

Present federal soil conservation programs, SCS and ACP, neither in design nor in operation include the problem of tenure. The ACP program dates from 1936 when Congress hurriedly authorized \$500,000,000 in annual appropriations to make payments to farmers for reducing acreage of soil-depleting crops and for adopting soil conservation practices. This stop-gap program to shrink production of surplus crops was enacted after the invalidation of the Agricultural Adjustment Act of 1933;¹⁴ it was retained in the AAA of 1938.

The ACP, financed by annual appropriations, stresses annual practices. It constitutes an "open offer" to all eligible farmers of specific payments for specific performances. It is designed to be administrable by elected county and community committeemen. It emphasizes financial accountability. Finally, it has ordinarily been viewed as a minor

part of the major program to get parity for agriculture. In consequence, it is difficult for the ACP program to embrace long-range farm planning, to experiment with reimbursing farmers for practices whose specific performance cannot be routinely checked, or to provide a flexible approach for differently situated farms. It is understandable that the inclusion of tenure considerations in the ACP program would be even more difficult.¹⁵

The SCS program, stressing conservation farm planning in physical terms, has not emphasized the relationships between tenure and conservation.¹⁶ Soil conservation district programs, since 1945 increasingly written by farmer supervisors,¹⁷ reportedly often talk of tenure. Yet it is doubtful that considerations of tenure enter significantly into the actual operations of districts.¹⁸ The National Association of Soil Conservation Districts, during Kent Leavitt's presidency (September 1947, to February 1950), frequently mentioned the significance of tenure for soil conservation; but the primary focus of the NASCD in its publications and in testimony before Congress has been upon other matters.¹⁹ As W. Robert Parks has stated:

"It is well known that the conservation program is very much dependent upon proper arrangements in farm credit, size of farms, landlord-tenant relations, and so on. The district, of course, cannot be censured for not

¹³Tharp, "A Reappraisal of Farm Tenure Research," *op. cit.*; Salter, *op. cit.*; Schultz, *Agriculture in an Unstable Economy*, (New York: McGraw Hill, 1945), p. 249, *cf.*, the volume edited by Ackerman and Harris, *op. cit.*

¹⁴U. S. v. Butler, 297 U. S. 1.

¹⁵Cf., T. W. Schultz' remark that there has been "little or no emphasis upon farm tenure in the agricultural adjustment program . . ." *Agriculture in an Unstable Economy*, *op. cit.*, p. 249.

¹⁶See the annual reports of the Chief of the SCS and SCS testimony in appropriation hearings.

¹⁷W. Robert Parks, *Effort to Synthesize National Programing with Local Administration in Soil Conservation Districts*, University of Wisconsin, Ph.D. thesis (1948) unpublished, pp. 68-129.

¹⁸Cf., the Senate and House field hearings of 1947; S. Res. 147, Part 2, 80th Cong., 1st Sess.; and "Long-Range Agricultural Policy," H. of R., Committee on Agriculture, 80th Cong., 1st Sess., Parts 6 ff. Cf., Southern, *op. cit.*, esp. p. 222.

¹⁹Kent Leavitt has urged modification of fee simple ownership in the direction of trusteeship. NASCD Information Letter Number 15, January 1949, and "The Challenge to Land Ownership," *American Forests*, September 1949. In November 1949, Mr. Leavitt noted an Iowa law suit in which damages were awarded a landlord because a tenant had plowed up 15 acres of hay land for corn without the landlord's consent, as stipulated in the lease. "Farm Tenancy presents one of the great social and economic problems of our age," wrote Mr. Leavitt who then appointed a committee to develop recommendations "for incorporating conservation farm plans into landowner-tenant leases." Information Letter Number 21. Since Mr. Leavitt's retirement, the NASCD journal, *American Soil Conservation District News*, has contained no mention of tenure; nor has the NASCD reported a standing committee on either credit or tenure in any of its conventions.

having corrected deep-rooted maladjustments in those arrangements."

Agreed. But in the context of this article, the SCS approach does not appear to be sufficiently general if the conservation of private land is to be sought essentially as part of a larger objective of improved farm family living—nor is the typical current approach, at least, of soil conservation districts.

4. Credit and Conservation

In many areas of the country, the production of numerous farms could be increased by one-fourth through farm improvement loans. The same analysis suggests that many farms are too small or too heavily mortgaged for farm improvement loans to suffice alone; farm enlargement loans are needed.²⁰ Even where the returns from more capital investments would exceed the interest on the capital, many farmers either refuse to make the investments or are unable to borrow money to make them.²¹ A vigorous extension of credit facilities has been urged in the South particularly where many farms remain underfinanced in view of the economic gains possible through use of credit.²² True, over-appraisal of relatively poor farms may saddle farmers with impossible debts. Moreover, at least one study suggests that some small farmers may value security and independence so highly that the emphasis should be upon improving the efficiency of their present operations

rather than attempting to enlarge their land bases.²³

Where the need for farm improvement and/or enlargement exists, a broader objective is indicated than "farming each acre according to its capabilities." But a restatement of objectives is not enough; the translation of agronomic and other information into forms usable by credit agencies and institutions is needed. To quote Kellogg again:²⁴

"Schedules for unexhausted capital improvements . . . lime, terracing, fertilizers, fencing, and the like, are very badly needed for both the perfection of credit for land use and management and for improving landlord-tenant contracts."

A land-mark in this field is Darryl R. Francis' *Bank Credit for Soil Conservation*²⁵ which visualizes conservation loans as "somewhat new in farm mortgage financing." The brochure analyzes physical inputs needed to improve individual farms, schedules the inputs and the credit needed for them, and provides for reappraisal including the value of anticipated improvements.

So much for the need, what of performance? Dr. Francis' analysis of one 267-acre farm called for a 25-year mortgage of \$13,617 at 4 percent; this was 60 percent of the "normal value." In 1945 individuals in the United States held 40 percent of the farm mortgage debt, and commercial banks held nearly 30 percent. Mortgages held by individuals averaged

²⁰ John D. Black, "Agricultural Credit Policy in the United States," *Journal of Farm Economics*, August 1945; "Poor Land, Submarginal land, etc. . . ." *Ibid.*, May 1945; "Tailored Credit for Land Improvements," *ibid.*, May 1946; and "The Future of Government in the Farm Mortgage Field," this *journal*, February 1947.

²¹ T. W. Schultz, "Capital Rationing, Uncertainty, and Farm-Tenancy Reform," *Journal of Political Economy*, June 1940, and "Agriculture in an Unstable Economy" (*op. cit.*), p. 203, n. 2. J. S. Davis accepts the concept of capital rationing but objects to the terminology, "American Agriculture: Schultz' Analysis and Policy Proposals," *Review of Economic Statistics*, May 1947.

²² "Agricultural Adjustments . . . in the South," Special Sub-committee on Cotton, H. of R., 80th Cong., 1st Sess., July 7-8, 1947, pp. 51-54; the reference is to the report of a committee chaired by Dean Frank J. Welch of the College of Agriculture, Mississippi State College.

²³ Rainer Schickele and John P. Himmel, *Socio-Economic Phases of Soil Conservation in the Tarkio Creek Area*, Iowa Agr. Expt. Sta. Bul. 241, Ames, October 1938; R. C. Engberg, "Federal Credit Agencies," *Journal of Farm Economics*, May 1947; Walter Wilcox, "Small Farms in Wisconsin," *Journal of Farm Economics*, May 1946.

²⁴ Letter to the writer, January 1948; cf., F. F. Hill, "Research Developments in Farm Finance," *Journal of Farm Economics*, February 1946.

²⁵ Federal Reserve Bank, St. Louis, 1945.

\$3,180 and were made for an average of 4.9 years; comparable figures for commercial banks were \$3,050 and 4.5 years.²⁶

Dr. Francis also provided a conservation loan for this farm of \$9,714 at 4 percent to be paid off in 9 years. In mid-1947, a survey of 1,200 commercial banks reported their outstanding loans for purchase and improvement of land and buildings. If the results are not indicative of the volume lent by the 12,000 country banks, the percentages are significant. Less than 6 percent of the production loans by these 1,200 banks were for more than \$5,000. Two-thirds of the loans were for less than six months. Interest, exclusive of fees, averaged 6.2 percent.²⁷

Against these figures we have the assertion by C. W. Bailey that "thousands of country banks are encouraging conservation farming in their home communities." Some banks have lent money to soil conservation districts for the purchase of equipment or have presented equipment to districts or (as in Georgia) have financed veterans in performing custom soil conservation work for farmers.²⁸ A number of state bankers' associations were queried about credit for soil conservation. Two state associations merely referred the writer to the Federal Reserve Bank and the Farm Credit Administration. The Georgia and Arkansas associations reported awards to farmers for following programs worked out with soil conservation districts. Several referred to the leadership of Oklahoma Bankers' Association (OBA).

The OBA circularized farmers in 1941 to ascertain how many had the power but

not the engineering advice to run their own terraces. The OBA paid part of the salaries of Oklahoma Agricultural and Mechanical College engineers who offered farmers the necessary advice. The OBA assisted SCS in establishing soil conservation districts and made numerous awards to farmers for completing conservation programs. It is not clear how many conservation loans have been made or what the procedures are.

"We always take into consideration in making a loan the value added by conservation practices on his farm. We have no set rules of appraising that as it is a matter left entirely to the judgment of the banker making the loan."

Farmers' intentions regarding soil conservation may be checked by his willingness to cooperate with his soil conservation district and to carry out his farm plan. It might appear that the SCS is developing as the advising technical agency for Oklahoma country banks in making conservation loans. Yet my correspondent says:

"We have made no arrangements with anyone to develop farm plans to be used by the banks to analyze credit needs. I do not know how practicable they would be. Many things enter into the granting of credit that cannot be settled by technical formulas especially when those formulas are provided by agencies that are not too familiar with the banking business."

No doubt a survey of the country would modify the import of the foregoing. A correspondent writes, "Bankers are now accepting soil improvement loans in north central Wisconsin, Missouri, and elsewhere." (1950). Dr. Francis declared that considerable effective conservation farm planning is being done by some country bankers but remarked that the experience had not been collected.²⁹ Yet extensive interviews especially in the

²⁶ *Agricultural Finance Review*, Bureau of Agricultural Economics, USDA, November 1946, pp. 52-56.

²⁷ *Ibid.*, Vol. 10, 1947, pp. 85-89.

²⁸ *What Bankers Can Do About Soil Conservation*, American Bankers Association, 1947. Mr. Bailey was President of the ABA at the time.

²⁹ Interview, December 1948.

southeast in 1950 indicated wide agreement among land-grant college people that the lack of credit was a serious obstacle to farm readjustment in this area.³⁰ So far as organized effort by bankers' associations is concerned, publicity abounds, certificates of awards are made, and testimonial dinners have been popular; but bankers are yet little inclined to use the technological assistance available in colleges of agriculture and elsewhere.

The Farm Credit Administration has done some work in this field. Stimulated by extension services, SCS, and TVA, the Federal Land Bank of Louisville developed a farm improvement loan which was made available on July 28, 1947.³¹ This loan budgets amounts to be lent against prospective developments, as scheduled, and calls for minimum principal repayments while conservation work is actually being done; 5, 10, or 15 years are allowed for final liquidation of the loan. If complex agricultural practices are called for, the services of a "qualified agricultural specialist" are stipulated in drawing up the farm plan. These first mortgage loans, bearing 4 percent interest, are limited to amounts from \$100 to \$50,000 and must not exceed 65 percent of the appraised value of the farm; but appraisal can include increments anticipated from conservation practices applied.

Accomplishments, however, fall short of what might have been anticipated. An interview in Summer 1949, with a ranking official of the Farm Credit Administration indicated that few farm improvement loans were being made. The schedules of inputs and outputs which Dr.

Kellogg has advocated have not been prepared and tested. In consequence, traditional conceptions of collateral continue to govern operations.

The conclusion is that agricultural credit has not been developed as a co-operating factor in the achievement of improved farm family living on a soil-conserving base. The reasons already cited to explain the failure of the ACP program to include considerations of farm tenure also account for the lack of attention to farm improvement or farm enlargement credit in ACP. Beyond cultivating the American Bankers Association, the SCS has not stressed credit as a tool of conservation policy.³² Credit is emphasized in written soil conservation district programs but apparently plays a small part in district operations.³³ During Mr. Leavitt's presidency, the NASCD occasionally referred to the relationship between credit and the attainment of soil conservation objectives.

5. *Implications for Improved Farm-Family-Living Policy*

Secretary Brannan's February 15 memorandum implicitly poses the question: What is the proper orientation of policy in this area? This is a good time to decide whether the focus should be upon land or people. This paper proposes a re-definition in favor of improved farm family living on a soil conserving base. A joint analysis among the USDA, the colleges of agriculture, the farm organizations, and others should be submitted to the Congress for its modification and adoption. Goals should be stated only in

³⁰ Little emphasis upon credit is found in the annual reports of the Chief of the SCS, although the 1948 report includes a one-sentence recommendation to improve the conservation credit structure. In "Soil Conservation and Better Land-use in the South," H. H. Bennett, Chief of the SCS, devoted a page and a half (of 105 pages) to the need for special credit for soil conservation. *Hearings, "A Study of Agricultural and Economic Problems of the Cotton Belt,"* Special Sub-committee on Cotton, Committee on Agriculture, H. of R., 80th Cong., 1st Sess. (1947).

³¹ Cf., *Hearings* cited in f.n. 18.

³² Interviews for a study of federal-state relations in agricultural research and education, under the auspices of the Commission of Financing Higher Education.

³³ *The New Farm Improvement Loan*, Federal Land Bank, Louisville (1947) and "Farm Improvement Loans," same source, mimeo.

general terms. So far as the program is advanced by governmental action, it should be jointly administered by the USDA and the land-grant colleges.

The program might proceed through selection of farms, hopefully typical, upon which adjustments are needed; the analysis of obstacles to adjustments; and provision for overcoming these obstacles. Demonstration and pilot farms could be vigorously used;³⁴ aids and benefits offered by various public programs should be flexible enough to fit into the recommendations for typical farms. The whole procedure should involve a periodic re-appraisal of goals against which accomplishments can be judged; the utility of this action would be to keep alive the challenge of an ideal.

6. *Obstacles to Defining and Carrying Out a Program for Improved Farm Family Living*

The federal system creates a major obstacle to the redefinition of federal soil conservation programs along lines advocated.³⁵ The SCS and ACP programs can hardly be charged with failure to take account of all the conditions which should be part of a program designed to improve farm living. Neither these programs as separately administered nor the anticipated combination of both can effectively bring in considerations of tenure, credit, farm taxation, and other matters that may figure in a more general program. By the same token the major planning of the redirected program cannot be left exclusively to the new federal agency. The inference is that the

colleges of agriculture should promptly and vigorously accept Secretary Brannan's invitation to participate in the formulation of state and local "conservation" policy.

But this participation is shot full of difficulties. Much friction exists between colleges of agriculture, the PMA organization, and the SCS. The friction is aggravated by differences between the Farm Bureau (with which colleges of agriculture and especially the extension services of many states are closely associated) and either the PMA, or the SCS, or both. Indeed, it is questionable whether the Farm Bureau will sit by and watch a major development of agricultural planning in which PMA, which approximates a farm organization itself, is an important partner. Even if Farm Bureau opposition is not serious, the agricultural colleges will find it hard to cooperate in a program wherein federal agencies make many of the final decisions. Could much of the proposed program be decentralized to the colleges of agriculture through federal grants-in-aid?³⁶ Powerful political opposition would greet this proposal. It is, perhaps, impossible so to decentralize the marketing quota, acreage allotment, and price support features of the PMA program to the states. Yet it might well be fatal to the improved-farm-family-living program, if it were divorced from these PMA activities. For the price-support, production-control activities have come to constitute *the farm program* in farmers' eyes. On the other hand, colleges of agriculture are reluctant to identify themselves with federal programs which in-

³⁴ Charles E. Kellogg, "The Natural Sciences and Farm Planning," *Journal of Farm Economics*, February 1947 (Proceedings number.)

³⁵ That this is not an argument against a federal system may be seen by consulting my "Programmatic Research and Agricultural Policy," *Journal of Farm Economics*, May 1947.

³⁶ President Allan B. Kline of the American Farm Bureau Federation expressed hope that this kind of decentralization might take place in about two years, through application of the basic principles of the Soil Conservation and Domestic Allotment Act of 1936. AFBF *Official News Letter*, July 15, 1950.

volve control and which are highly political.³⁷

Even to overcome the foregoing obstacles would not be enough. If improvement of farm family living seems to call for new lines of credit and tenure reform, for example, no possible combination of public agencies, however effectively cooperating, would be enough to carry it through. So long as a major fraction of agricultural credit is handled by private individuals and banks, the provision of credit for farm enlargements and improvement will need to be developed through some kind of agreement with private lenders. Furthermore, if state laws respecting banking, tenure, or taxation appear to need modification, political decisions are required. It seems necessary to stress the elemental point that this kind of public action is outside the ability of any combination of administrative agencies.³⁸

A number of other problems will be passed over in order to stress the difficulty of defining and establishing the goal of improved farm family living on a soil-conserving base.

The great strength of the ACP and SCS programs teaches the importance of defining goals in ideal terms. Both programs operate toward simple objectives—parity for agriculture and the use of each acre within its capabilities, respectively. The history of mass political movements reveals the paramount importance of simple, concrete, intelligible goals by

which all actions and eventually all thoughts can be measured, accepted, elevated, enshrined—or rejected and suppressed. In the science-worshipping modern world, it greatly strengthens such goals if they can be described as “scientific.” Both the drive for price supports and for soil conservation are mass movements; both gain strength from oversimplification of objectives; both have developed simple criteria by which the faithful are easily distinguished from the heretics; both are elaborately “scientific.”³⁹

In contrast, the proposals for orientating toward improved farm family living are deliberately general, vague, and open-ended. This goal cannot be defended “scientifically” in the simple terms that its rivals are. If (for the sake of the argument) we grant that the capabilities and limitations of each acre can really be “scientifically” ascertained, who will

³⁹ This statement should not be read as a personal indictment of individuals involved; it is essential to lift our political analyses to the level of analyzing processes, institutions, and values—as these influence and are influenced by individuals and groups. It is argued that the federal programs, SCS and ACP, separately, or in combination tend to have the characteristics noted. It is further argued that the continuous concern of administrators, farm leaders, and farmers with programs so orientated tends to produce habitual responses and conceptions which favor the simple, “scientific,” inexorably right goal. It is finally argued that these habitual responses and conceptions may be carried over into other fields—may contribute to attitudes that answers to complex political problems can always be scientifically found and simply expressed, that positions can be reached so clearly that what is good and what is bad will be self-evident. Then it can truly be said that “he who is not with us is against us.” In stressing the role of the colleges of agriculture to broaden and generalize the goals of farm policy in this field—to insist on the human orientation of this policy, even at the expense of simplicity and clarity with respect to what ought to be done—the writer does not imply that the college folk are more virtuous than federal administrators. Rather, he implies that this breadth of purpose is something which the colleges can hardly escape attempting to express, by virtue of their orientation as educational institutions. Contrarily, the breadth of purpose here advocated is all but impossible for certain federal agencies to incorporate by themselves, given their orientation to the program objectives which they have, and given the partial approach which they are charged to employ.

See my “Reflections on Agricultural Policy,” *op. cit.*, and the challenging book by Hans J. Morgenthau, *Scientific Man versus Power Politics*, (University of Chicago Press, 1946), and the writer’s article, “The Politics of Conservation,” *Journal of Politics*, August, 1951.

³⁷ See a mimeographed statement of the testimony of representatives of the Association of Land Grant Colleges and Universities before the House Committee on Agriculture, January 13, 1948, also a statement by the Association’s committee on agricultural policy, *Hearings*, “Long Range Agricultural Policy,” Committee on Agriculture, H. of R., 80th Cong., 1st Sess., Part 15, pp. 1789-90. Compare *Federal-State Relations in Agriculture*, Parts I and II, *Bulletins of Iowa State College*, Ames, Vol. 38, numbers 2 and 28 (1938 and 1939). See also my articles, “Programmatic Research and Agricultural Policy,” *op. cit.*, and “The Politics of Agriculture,” *Journal of Farm Economics*, November 1950.

³⁸ See my article, “Reflections on Agricultural Policy,” *American Political Science Review*, October 1948.

pretend to calculate the capabilities and limitations of human beings? Indeed, the program proposed invites dissension; it incorporates factionalism and confesses itself often unable to tell the sheep from the goats among the warring factions. It invites attention to conflicts between owners and tenants, debtors and creditors; it stirs up differences and goads antagonists. But it does none of these things in the spirit of the revealed truth; rather the ideal that it offers is man-conceived, man-directed, man-criticized,

man-changed. The definition and provision of this kind of ideal is full of difficulties. But make no mistake, we will have ideals. The question is whether they will be simple, hard and fast, inexorable, and (in the end) intolerant—or whether they will be flexible, full of difficulty, productive of compromises and expediencies, and always unattainable. It is vital to recognize that this kind of alternative, which pervades much modern politics, manifests itself in agricultural policy.

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Equity Grounds for Property Taxation Re-examined

By HAROLD M. GROVES* and LOUISE PROBER**

Introduction

A large, though decreasing, part of the total tax load is distributed through the time-honored general property tax, and for many units of government this tax is synonymous with the whole tax system. Resurgence since World War II of property tax increases (at least in relation to assessed value) has again brought the tax into the limelight of public attention. Consequently a re-examination of some of the criticisms frequently leveled at the property tax is not unwarranted. The particular criticism to which the authors wish to direct attention here is the one which holds that the property tax is unfair, unjust, and inequitable.

In re-examining the alleged unfairness of the general property tax, some statement of the criteria of tax equity is clearly necessary. A tax may be considered inequitable if it does not conform to either (or both) of the accepted standards of equity in taxation—benefits received or ability to pay. Benefits received call for distribution of the costs of government according to the size of the package of services received from government. Ability to pay calls for distribution according to the width of the taxpayers' respective economic shoulders.

The ability principle may be violated in several ways. For example, regressivity is usually accepted as a violation; the tax must be at least proportional to its standard. However, a tax which, without a public policy purpose, ignores some sources of ability to pay while taxing others, also violates this principle; thus

tax-exempt securities, in the income tax field, are often deplored on the ground that the income tax is supposed to be based on ability to pay and interest on these securities affords the same ability to pay as other income. Sometimes, when the discussion centers on consumption taxes, still a third criterion of equity is considered, namely, equality of tax burden on all types of consumption outlay. This criterion may stand independently of other criteria or it may be incorporated with them: other things being equal, that tax or tax system is preferable (and more in accord with ability to pay) which does not discriminate, at least without a public policy purpose, among types of consumption outlays.

Equity analysis in the property tax field is indeed bedeviled with confusion. Sometimes the property tax is criticized because it contradicts the benefits-received principle, sometimes because it contradicts the ability-to-pay principle, sometimes because it burdens housing unduly. The attack based on ability to pay is usually directed at particular parts of the property tax and the definition of ability to pay may vary with the particular portion of the tax being criticized. Sometimes the *impact* of the tax is the point of censure and at others the *incidence* is suspect. The analysis of impact seems most appropriate when the benefits-received principle is under consideration; here the government is treated as a factor of production. The benefits to producers' property rendered by the government are also benefits to the consumer in the sense that they facilitate production of the goods he desires. The

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tax is thus regarded like any other payment for the services of a factor of production. However, if the property tax is discussed from the standpoint of ability to pay, incidence appears the more important point to examine; it is the ultimate rather than the initial burden that should most concern us. But since taxes are often shifted only in part, attention to incidence need not eliminate all concern about impact. And if shifting is a highly irregular and capricious matter, the hope of finding an equitable pattern of burden, ultimate or immediate, would seem highly unpromising.

Alleged Inequities of the Property Tax

We shall begin by reviewing certain common criticisms of the property tax on the score that it is incompatible with accepted standards either of benefits received or ability to pay. In a later section we shall develop an alternative concept of ability to pay which may be applied to the tax. And in the last two sections we shall consider particularly the problem of omissions and of discrimination among consumers' expenditures.

Benefits Received. A tax levied according to the principle of benefits received has three major characteristics: (1) it is a compulsory contribution exacted from the individual or group by the government; this characteristic is shared by every tax; (2) the taxpayer is guaranteed no specific *quid pro quo* as would be the case if this were a *price*; however, (3) the revenue from the tax is spent in such a way that (more or less) measurable benefits proportionate to his payment are received by each taxpayer.

Since the property tax is based on the assessed value of property, the latter in turn reflecting market value, the property tax can be a benefit tax only if there is a positive correlation between the value of a unit of property and the

government services rendered to that property.

To some extent, such a correlation between property values and government services does exist. For example, if the government were to withdraw its fire and police protection, garbage collection and sewage disposal services, and street cleaning and maintenance, the property would become less desirable and its value would tend to fall; to prevent such a reduction in value, property owners might well establish these services on a private basis, perhaps even paying for them as they do now, according to the relative values of property.¹

In order to apply the benefit theory to property tax burdens, it would be necessary to determine the actual effect on property values resulting from government services. However, since government services are only one of many factors affecting the value of property, these values may vary in ways having little to do with the package of government services to property. For example, as a structure ages or becomes obsolete, its value tends to fall although government services to that property have not fallen and indeed may have risen. Changes in business conditions will affect property values without necessarily causing comparable changes in services provided by the government. Increased demand for particular products or locations may increase property values without any corresponding change in benefits received by the property from government. In short, it would be possible to calculate the value of government services to property only if other things remained

¹ If the services were withdrawn from a particular area of a tax jurisdiction, the property would become less desirable relative to other areas of the tax jurisdiction. Even if these services were withdrawn from the entire tax jurisdiction and even if there were no other places to which present occupants could move, property values might still fall simply because the occupants would conclude that property without the services is not worth as large a part of their incomes as they have been paying.

equal, and other things generally do not. Consequently it becomes extremely difficult to measure directly the benefit of government services to property. It might be argued that the benefit could be measured indirectly by using the cost of the service, that is, by defining benefit and cost as equal. Such an identity often constitutes the assumption behind special assessments, but its validity in the case of special assessments is doubtful, and there seems to be no reason to believe that it is any more valid in the case of government service in general.

Ability to Pay. Historically the ability-to-pay concept has referred to the *personal* ability to pay and in testing the property tax on the ability standard we have looked to property taxpayers and particularly to their current net incomes. The property tax has been justified on the ground that a correlation between levies and such personal ability to pay did in fact exist, but of late this proposition has met with increasing skepticism. This is so for several reasons:

(1) In the case of a property tax on *owner-occupied residential real estate* there is often a very poor correlation between the value of the property and the income of its owner. To be sure, income need not be the only measure of ability to pay but it has become the predominant measure. Furthermore, even if wealth were substituted as the measure, the violence done by the property tax to the ability-to-pay concept is evident in the fact that the home owner who has a mortgage gets no credit under the property tax for his liabilities.

Although sometimes the same factors (e.g., a depression) may operate in the same direction on a home-owner's income and on the value of his home, there is nothing in the myriad of factors affecting personal net income which will

automatically insure proportionate changes in the value of his home.

A special aspect of the relationship between the income of the home owner and the value of his home is often raised in connection with those home owners who live on fixed incomes—e.g., savings or pensions. It is argued that the inflation of recent years has reduced their real income (and therefore, their ability to pay taxes) while no corresponding reduction has taken place in the property taxes on their homes. To some extent, the real villain in this piece is inflation rather than the property tax. Any tax, even the personal net income tax, becomes more onerous when a rising price level reduces real income. Even granting this qualification, it is sometimes argued that the property tax imposes a particularly serious problem because it is a tax on a somewhat inflexible item in the consumer's budget. That is to say, it is argued that the strong sentiments which develop around the old family home make the owner extremely reluctant to give it up; when inflation reduces his real income, the owner prefers to curtail expenditure on other items and increase the proportion of real income devoted to housing to whatever extent necessary to retain his home. For such individuals, it is probably true that a sales tax would be relatively more advantageous than a property tax, because their decreased expenditure on goods other than housing would enable them to avoid a sales tax. (It should be noted that this argument implicitly compares the incidence rather than the impact of the sales tax and the property tax, though in respect to the property tax applied to owner-occupied houses the two are largely the same.) However, there is no evidence to show that all or a majority of fixed-income home owners have this preference for housing. Furthermore, those

individuals who feel differently, i.e., those for whom housing is a flexible item and who prefer to maintain their standard of living with respect to other commodities, would be penalized by the substitution of a sales tax for the property tax. And finally it should be noted that reduction of the general property tax as a solution to the hardships allegedly worked on home owners overlooks the probability that the incidence of this tax is to a considerable extent diffused among *all* items of consumption.

(2) In the case of *tenant-occupied residential real estate*, it is held that a good part of the tax is likely to be passed on to the tenant, and the tax thus becomes a levy on the consumption of housing services.² Since the percentage of income spent on housing tends to decline as income rises, the property tax on residential real estate is regressive. If we assume, as is commonly done, that ability to pay must be related to personal income and that a tax must be at least proportional to such income (not regressive) in order to qualify, then the tax here violates the ability standard. Indeed it is sometimes argued that a sales tax could be constructed which would be less regressive than the tax on residential property. This is entirely possible. However, a note of caution must be added. The property tax is by no means confined to residential real estate. Merchants, manufacturers and farmers share its impact. Reduction of the property tax and substitution of a sales tax would affect not only the occupants of homes but merchants, manufacturers and farmers as well. Moreover, according to traditional (and still widely-accepted) incidence theory, that part of the residential real estate tax which is on the site value of land tends to be capitalized:

² It should be noted that here again the argument is based on the incidence of the property tax.

that is, the prices which prospective purchasers will pay for the land tend to be discounted by the amount of the anticipated taxes on that land. To the extent to which the buyer is successful in anticipating future taxes and in discounting for them, that part of the residential real estate tax which represents a levy on the site value of land does not affect the net rate of return on his investment in the property; consequently this part of the tax tends not to be shifted to the tenant. Therefore, calculation of the dollar burdens on various income groups of property and sales taxes should proceed subject to the consideration that the present occupants are not in reality burdened by all of the property tax levied on the houses in which they live. This idea throws substantial doubt in the path of those who would relieve consumers of housing by less regressive sales taxes (the incidence of which is all or nearly all conceded to be on the consumers.) To cite an extreme case, obviously a highly regressive tax need be of small concern to consumers if they only bear, let us say, one percent of it.³

(3) In the case of *commercial and industrial real estate*, the income-earning possibilities of such property strongly

³ The possible effect of a substitution of sales tax for property tax on housing under stated assumptions is illustrated mathematically below.

1. Percent of income assumed taken by the tax were it all shifted forward:

	Rich	Poor
Sales Tax	22	28
Property Tax	20	30

2. Percent of forward-shifted tax assumed to be paid by:

	Rich	Poor
Sales Tax	30	70
Property Tax	25	75

3. Percentage distribution of total tax assuming 30 percent of the property tax was capitalized by and burdenless on the present property owner and that the sales tax is shifted forward in full:

	Rich	Poor	Burdenless
Sales Tax	30	70	
Property Tax	21	49	30

Thus the substitution of \$100 of sales tax for \$100 of property tax, on our assumptions, would increase the burden upon poor homeowners from \$49 to \$70.

affect its taxable value, but even here there are many yearly variations in the net income of real estate that find no counterpart in the assessed value of the property. Furthermore, the market value of property tends to reflect its income-earning possibilities in its most profitable use. This may differ from its actual use and actual earnings at any one moment of time. Thus it is questionable that the impact of the tax is in accordance with ability to pay. In addition, to the extent to which the property tax is passed on to the consumers of the goods and services produced on the property, the tax becomes one on consumption and this brings up again the question whether the *incidence* of the tax is in accordance with ability to pay.

(4) In the case of the tax on *merchants' and manufacturers' inventory*, it is argued that there is inequity at the point of impact because taxpayers with slow-moving stock (jewelry) pay more relatively than those with fast moving stock (meat). This larger payment, it is said, might be required notwithstanding the fact that the business man with fast-moving stock might have a greater volume of business and a greater net return. To the extent to which this argument is valid, either a sales tax or an income tax would seem a logical alternative to mitigate this discrimination. However, this allegation of inequity is predicated on an analysis of the *impact* of the tax. If we consider the incidence of the tax, the inequity (at least so far as the merchants are concerned) may turn out to be more apparent than real.

Essentially the situation complained of is the following: (a) If the yearly rate of return on capital invested per year is equal in meat and jewelry before the advent of the tax; and (b) if the inventory on hand on any one day is a smaller

percentage of yearly investment in the case of meat than in the case of jewelry; and (c) if then a property tax on inventory is imposed at any given rate; then (d) the rate of return after tax is greater in the case of meat than in that of jewelry.

It should be noted that, in order for the inequality of return described in (d) to be true in the short run, it must not be possible to shift a greater percentage of the tax on jewelry than is true of the one on meat. For example, to take an extreme case, suppose the demand for jewelry were almost completely inelastic and the demand for meat almost completely elastic; then almost none of the tax on meat could be shifted whereas almost all of the tax on jewelry could be passed on, and the rate of return after tax in jewelry would exceed that in meat.

In the long run, moreover, the inequality of return described in (d) will tend to disappear if the supply of jewelry relative to meat can be sufficiently reduced (that is, if there is free exit out of fields of slower turnover and free entry into fields of more rapid turnover). But the disadvantage placed upon industries of slower turnover by the imposition of an inventory tax cannot be ignored. The adjustment of supply by the migration of factors of production takes time and may be painful. However, since the inventory tax in many states has been in existence for a long time, it would seem reasonable to assume that much of the discrimination among lines of business has been discounted by economic adjustments over time.

Another Concept of Ability to Pay

We have examined some of the common considerations supporting the view that general property taxation does not comply with accepted standards of benefits received or ability to pay. While

some of these considerations are vulnerable, the others add up to a fairly conclusive indictment. Some have concluded from this that the property tax has no justification at all in terms of equity. But before we accept this severe indictment let us explore the matter a bit further.

It would seem that a more plausible conception of the general property tax is in terms of a sort of impersonal ability to pay. Property is valuable mainly because it can earn (or in the case of consumption goods, like houses, can save) income. This gives it the potential or creativity for meeting tax bills. Property also represents wealth (accumulated past income) and this also has taxpaying potential in and of itself.⁴ The neo-classical analysis of ability to pay associated with E. R. A. Seligman conceived the term as comprised of two elements: *sacrifice* and *faculty*. The former is a psychological concept that can hardly be divorced from natural persons. But the latter concerns itself with instrumentalities (personal and impersonal) that are capable of meeting tax bills. The fact that property has exchange value indicates that it is capable of rendering economically productive services, since the exchange value is the sum of the values of the anticipated services discounted to the present. Thus ability to pay as faculty can be attributed to property or the possession of property as such.

In our society individuals assume certain responsibilities only if their ventures turn out well. Certain other obligations exist, however, irrespective of the success or failure of the enterprise. Thus a

business management is expected to pay dividends only if the business is successful. But it is expected to pay its creditors "whether or no." Some taxes are like dividends and are imposed only upon the successful. Others, including the property tax, are like interest. In a world of free contract it matters little whether the tax is borne by debtor or creditor, occupant or owner, as long as the same creativity is taxed once only. It also matters little in whose hands circulating capital may be found on assessment day. Personal inequalities will be discounted as they are anticipated and made the subject of exchange agreements.

Several objections may be offered to this approach. (1) Even though sales value and, in the case of property earning a cash income, capitalized earnings measure the economic productivity of property, it may be argued that assessment techniques lay insufficient stress on sale value or capitalized earnings. To the extent that this is true, of course, the property tax cannot be justified as a levy on the economic productivity of property and, if such a justification is accepted, assessment techniques might have to be modified accordingly.

(2) It may be argued that, although the value of property represents its economic productivity, tax bills are not paid with economic productivity but with cash, and some forms of property, such as owner-occupied homes, yield services but no stream of cash to the homeowner. However, the property is not any the less productive because the owner chooses to be "his own landlord." Only the institutional fact of tenure arrangement, not an absence of economic productivity, prevents it from yielding cash. The productivity of owner-occupied residences is recognized by the statisticians when they count the rental

⁴ It is true that the theory of the property tax does not contemplate that the taxpayer will ordinarily pay this recurring levy by liquidating his investment. But he can do this as a last resort if he chooses to keep his property in non-productive form or if he fails to make his property produce according to its potential. The capacity of wealth as such to meet taxes is recognized in personal "net worth" taxes.

value of such residences as part of the national income. It is also recognized by the British income tax which reckons such value as current income. Furthermore, even our own personal income tax departs from a strictly cash concept of income by including some payments in kind. And it has been criticized for excluding so-called "imputed income" from its base.

(3) It will be said that the approach to the property tax here under consideration loses all validity when one recognizes that much of the levy imposed on landlords and business men is shifted to tenants and customers. But the owners of property have no assurance that property taxes can be shifted. The risk associated with prices is one that goes with the responsibility of ownership. The property tax, in this respect, is like other non-contingent cost and conditions of business.

(4) Finally, the objection will be raised that, since taxes are paid ultimately by individuals, impersonal taxes and impersonal criteria are at best fictions and at worst dangerous illusions about the nature of the tax system. An answer might be made to this on the ground that considerations of incentive and the inadequacies of administration (particularly local administration) make it inexpedient to load all the burdens of government on personal net income. However, the authors prefer not to offer such an answer here because it involves considerations other than those of equity and is consequently outside the scope of this article. The productivity or faculty approach here presented should not be construed as an argument for impersonal rather than personal taxes. In fact, it is the authors' opinion that on grounds of equity alone, impersonal taxes can rarely if ever compete with personal taxes. What the faculty or productivity approach does is to provide a frame of

reference appropriate to an analysis of the essential nature of the property tax. And we might add that, as previously indicated, the concept of obligations existing independently of the individual's current cash resources is by no means confined to the tax world.

Discrimination Among Consumption Functions

The property tax is said to place an unneutral (inequitable) burden on the item of housing expenditure in consumers' budgets. This is said to be not only unfair to those whose consumption requirements or preferences run to housing; it is also contrary to the social interest in better housing for low-income groups. To test the validity of this contention with finality would require an elaborate analysis of the incidence of all taxes and the association of ultimate burdens with consumption functions. Here we can only suggest that the property tax is not by any means a levy on housing exclusively and that other levies do compensate substantially for its conceded bias against shelter.

In Wisconsin, the assessed value of residential property (not including farm homes) has in recent years amounted to about 45 percent of the assessed value of all property locally assessed. Thus, if we are to assume that all landlords' taxes are borne by tenants, the property tax leans heavily on the outlay for shelter. Leaving aside controversial questions of incidence, we may still observe, however, that over half the tax falls mainly on other budgetary items. The personal property tax and the real property tax on mercantile, manufacturing, and agricultural property, insofar as they are diffused by shifting, are burdens on all, or nearly all, items of consumers' outlay. As to other levies, automobiles, tobacco, liquor, travel and much recreation and personal-care outlays are subject to federal and/or

state excises. Public utility services also are covered by special levies. This leaves food, furnishings, fuel, clothing, medical care, and education perhaps relatively unencumbered except in general sales tax states. However, these items cover necessities some of which rank with or even higher than housing in the hierarchy of social solicitude.⁵

Inequitable Omissions

The property tax is also said to be inequitable on the score that it omits certain sources of income. If it be conceded that property ownership is characterized by a certain impersonal ability to pay in that it has the capacity to generate or save income, is not the same true of certain other phenomena, notably jobs and transactions? And if all of these are alike in their creative potential, is it not a violation of neutrality to tax one and not the others? That this line of argument has some validity must be conceded. It lies behind the movement in certain cities to broaden the local tax base to include payrolls. Here the creative factor (within its own class) is readily measured by the volume of wages and salaries. But it is a much more difficult task to equate the burden between this species of capacity and that associated with property. Logically, income from wages and salaries should be capitalized before they are taxed (at

least on the same roll with property.) This difficulty is reminiscent of the one encountered in differentiating earned and unearned income in the income tax field. In the case of transactions even greater difficulties are apparent. Should one use the volume of transactions as a measure or select "value added" to avoid duplication? Considering the tendency towards regressivity on the part of such levies and the consistency of their incidence on the consumer, perhaps the tax system does not suffer by their omission.

Conclusion

This article is not intended to be a defense of the general property tax. The theoretical grounds on which the general property tax is impugned have been examined and some have been found valid, some invalid, and some partly valid. Attention has been called to the confusing but necessary shifts from impact to incidence in this analysis. It has been suggested that ability to pay in the property tax field is most appropriately viewed as the ability of property to produce income in the ultimate sense of that term. Undoubtedly stronger grounds for a (properly administered) property tax can be found in other areas than equity. But equity is a relative matter. From what has been said it is proper to conclude that, in the authors' view, the sins of this tax culprit have sometimes been exaggerated. And the analysis further suggests that property tax "relief" by the substitution of certain other regressive levies may be a case of jumping from bad to worse.

⁵ If the housing function is judged to be unduly burdened by local taxation, two remedies within the property tax institution suggest themselves as appropriate, one already in use in this country. The first is governmental subsidies for low-cost housing. The second is a device employed to some extent in the Canadian Province of Ontario. This provides a differentiated tax, through a bracket system, of weighting assessments within the lower ranges of rental values.

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Buying Farms with Hundred-Percent Loans: An Analysis of the Farm Security Administration Loan Experience in Wisconsin†

By W. KEITH BURKETT* and KENNETH H. PARSONS**

THE people of the United States, through the federal government, have been conducting an experiment for more than ten years in loaning individuals the full purchase price of a farm. The purpose of these loans has been to assist worthy tenants to become owners. The experiment has been on a limited scale with about two percent of the tenants in this country having been assisted. This liberal farm loan policy is simply the latest of a long line of public efforts to encourage or assist the ownership of farms by the families operating them. The present article appraises this loan experience in Wisconsin.

I. The General Problem

Farm ownership has always been a goal of most farmers in this country. To a considerable extent farm ownership by operating farmers has also been a goal of public policy. The various homestead acts under which the country was settled, the Federal Land Bank and the Land Bank Commissioners' loans are examples of government action to aid farmers toward their goal.

In spite of these efforts, ownership by operating farmers has declined considerably from what it was when the first census of agriculture was taken in 1880. The decline has been irregular, but it has been persistent. Tenancy has in-

creased more rapidly in times of agricultural depression such as occurred in the early 1930's; while ownership increased when farmers were unusually prosperous as during and just after World War II.

The difficulties which farmers face in acquiring ownership of their farms have been investigated many times. It is these difficulties which the F.S.A. tenant-purchase loan program has attempted to solve. The conclusions from the more pertinent of the studies of these obstacles to farm ownership are presented in condensed form below:

Interpretations from Previous Studies

Conclusions from previous studies concerning paying for farms from earnings were these: (a) Spillman thought it was still possible for a young man starting without capital to become a full owner, but he noted that the time spent in the pre-ownership stages was becoming longer.¹ (b) Stewart did not believe it possible to pay for farms out of their earnings in most of the areas in his study. But he admitted that his averages might conceal some more successful individuals.² (c) Parrish's calculations showed that a few McHenry County, Illinois farmers could have paid for farms at the 1940 level of income and most of them could have done so at the 1942 level.³ (d) Pond and Cavert found there would be years, even for most of the better

¹ W. J. Spillman, "The Agricultural Ladder," *American Economic Review Supplement*, March 1919.

² George Stewart, "Can the Farms of the United States Pay for Themselves?" *Journal of Farm Economics*, October 1920; also "Size of Initial Payment Required to Permit Purchase of a Farm in a Given Time," *Journal of Farm Economics*, July 1921.

³ B. D. Parrish, "How Long Will It Take an Operator to Pay for a Farm From Earnings?" *Illinois Farm Economics*, No. 102, November 1943. Extension Service in Agriculture and Home Economics, University of Illinois, Urbana.

† This article reports the major findings of an investigation made by Prof. Burkett in his Ph.D. dissertation under the direction of Prof. Parsons. The thesis is filed in the University of Wisconsin Library as: *Acquiring Farm Ownership by 100 Per Cent Loans*, 1948.

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farmers, when income would not be sufficient to make their farm payments even though average earnings were enough.⁴ (e) The North Central Regional Land Tenure Committee concluded that progress may be made if debts are contracted at the right time.⁵ (f) Salter found that farmers were not making progress toward ownership and concluded that a general increase in operator equities seemed possible only in the early years of high farm income, and this increase would soon be more than offset as higher incomes hastened the retirement of owner-operators.⁶ (g) Parsons and Waples found that farmers in parts of eastern Wisconsin had maintained a very high percentage of ownership in an area where farms were valued even higher than in the high tenancy area of Wisconsin.⁷

Difficulties in the way of paying for a farm from earnings on it were: (a) Farms may become overcapitalized. Spillman.⁸ (i) Farms may become overcapitalized due to speculation in relatively new farming areas. Stewart.⁹ (ii) They may become overcapitalized periodically as in wars and business booms, said Pond and Cavert¹⁰ and the North Central Regional Land Tenure Committee.¹¹ (b) In some areas land values, whether overcapitalized or not, are too great to be paid for out of a farmer's labor income. Salter.¹² (c) Fluctuations in farm incomes coupled with rigidities in repayment requirements make 100% loans impractical. Pond and Cavert.¹³

Suggested solutions included: (a) Improve credit with government participation to facilitate progress up the agricultural ladder. Spillman.¹⁴ (b) Inherit a farm, marry a girl with a farm, or be a tenant. Stewart.¹⁵ (c) No recommendation, but debt paying

capacity varies with individuals and by years as affected by price movement. Parrish.¹⁶ (d) Stay within a "safe" amount of credit. Pond and Cavert¹⁷ and North Central Regional Land Tenure Committee.¹⁸ (e) Recognize near impossibility of full owner-operatorship. Improve landlord-tenant relationships, debtor-creditor relationships, and intra-family transfers. Salter.¹⁹ (f) Use the family resources in assisting members to overcome the obstacles and uncertainties of the market economy. Parsons and Waples.²⁰

The Problem for This Investigation

The tenant purchase loan program of the Farm Security Administration was directed toward overcoming the capital and management obstacles to owner-operatorship. Two of the major obstacles have been the relatively high values of farms and the extreme fluctuations in the prices of farm products. Farm values are high now because the prices of farm products are high and because money with which to buy farms is more plentiful. But over a longer period, farm values have increased because the size of farm a man can handle has increased; a farmer has to buy more acres in order to have an efficient-sized farm. Theoretically, in a period of stable prices the net earnings of the farm as such will equal only interest on the value of the farm.²¹ Consequently, if the farm is maintained when the debt is equal to the full value of the farm, the only source of payments on the principal of the debt is from the operator's (and family's) wages of labor and management and investment earnings on personal property. So, if the size and cost of a farm increase, the difficulty of paying for a farm increases unless the purchaser

⁴ George A. Pond and William L. Cavert, "How Long Does It Take to Pay for a Farm Starting with Heavy Debts?" *Journal of Farm Economics*, November 1944.

⁵ North Central Regional Land Tenure Committee, *Capital Needed to Farm in the Midwest*, Pub. No. 5, Bul. 389, Minn. Agr. Exp. Sta., St. Paul, January 1946.

⁶ Leonard A. Salter, Jr., *Land Tenure in Process*, Res. Bul. 146, Wis. Agr. Exp. Sta., Madison, February 1943.

⁷ Kenneth H. Parsons and Eliot O. Waples, *Keeping the Farm in the Family*, Res. Bul. 157, Wis. Agr. Exp. Sta., Madison, September 1945.

⁸ Spillman, *op. cit.*

⁹ Stewart, *op. cit.*

¹⁰ Pond and Cavert, *op. cit.*

¹¹ North Central Regional Land Tenure Committee, *op. cit.*

¹² Leonard A. Salter, Jr., *op. cit.*

¹³ Pond and Cavert, *op. cit.*

¹⁴ *Op. cit.*

¹⁵ *Op. cit.*

¹⁶ *Op. cit.*

¹⁷ *Op. cit.*

¹⁸ *Op. cit.*

¹⁹ *Op. cit.*

²⁰ *Op. cit.*

²¹ A study of northern Illinois dairy farms indicated that only a few farmers could pay for their farms from income over a lifetime at 1940 prices, but the average owner and part-owner farmer could pay out in 11 years at 1942 prices. Parrish, *op. cit.*

has a larger amount of funds for the down payment or unless the farmer's wages of labor and management increase in proportion to the value of farms. The liberal loan program of 100% credit was designed to meet the critical problem of providing the initial risk capital to tenants who otherwise seemed to have the qualifications for successful owner-operators.

The general problems presented by the difficulties of acquiring risk capital are undoubtedly among the more strategic in the future ownership of farms by the families who operate them. There is little doubt that among the farm families of greatest wealth many sons will have strong competitive positions in the struggle to acquire ownership of farms. The farm tenant-purchase loans were intended to help competent farmers who lacked the necessary down payment of risk-capital to secure ownership of farms. It is therefore an experiment designed to test out the possibilities of making loans where the security offered by the borrower was essentially farming ability and moral integrity. It is this search for hitherto unused margins of security that make the tenant-purchase loan experience of general significance.

The problem for this study is to investigate this liberal loan program in Wisconsin and to evaluate the effectiveness of the program in dealing with the basic risk capital problem of farmers of limited means, with farm management counsel available from the lending agency. This requires that we seek out the strategic relations within the actual experiences of the borrowers during the past few years.

The tenant-purchase loans have been repaid at a rapid rate, due to the prosperity of recent years. Any evaluation of this loan experience must somehow discount and take account of the historical

accident that a program which was initiated in the relatively dull years of 1937 and 1938 carried over a decade later to the lush prosperity of a postwar inflation. In this study we shall attempt to assess the experience point by point arriving eventually at a judgment as to the probable success of such a program during more normal times. This is essentially the task which interested citizens face in trying to decide whether such a program of easy farm credit is sound public policy.

II. The Development of the Tenant-Purchase Program

The Bankhead-Jones Farm Tenant Act. In the early 1930's farm incomes had fallen so low that farmers were not only failing to make progress toward ownership—they were losing ownership in considerable numbers through mortgage foreclosure. On July 22, 1937 Congress passed the Bankhead-Jones Farm Tenant Act. This act included some but not all of the recommendations of a committee of agricultural experts after a study of tenure problems in this country and schemes designed to solve similar problems in other countries.²²

The Bankhead-Jones Farm Tenant Act, among other things, authorized the making of loans to farm tenants and others for the purchase of family-type farms. Preference was to be given to those applicants who had dependents and who were equipped to operate farms.

The act authorized the appropriation of not to exceed \$10,000,000 for the first (1937-1938) fiscal year, not to exceed \$25,000,000 for the 1938-39 fiscal year, and not to exceed \$50,000,000 annually thereafter.²³ Loan funds were

²² *Farm Tenancy, Report of the President's Committee, February, 1937.*

²³ *The Bankhead-Jones Farm Tenant Act, United States Statutes at Large, 75th Congress, 1st Session, 1937, Vol 50, Part 1, Public Laws.*

to be distributed among the states on the basis of population and the prevalence of tenancy. State committees were set up to select counties in which the earlier loans would be made and local farmer committees were appointed to aid in the selection of borrowers and farms. The loan program was administered by the Farm Security Administration.

Special features of the tenant-purchase loans under the Bankhead-Jones Farm Tenant Act included: (1) Expert appraisal of farms selected by applicants and the assignment of long-time or normal values to the appraised farms. (2) The tenant-purchase loan could be as great as but could not exceed 100% of this appraised normal value including necessary repairs and improvements. (3) Borrowers were assisted in making long-term and year-to-year plans and were required to keep farm business records. (4) Loans were to be amortized over a 40-year period with 3% interest. (5) After the earliest loans most borrowers used the variable repayment plan under which the amount to be repaid was determined after examination of the year's records—if the year had been unusually prosperous for the borrower he paid more than the amount required for a 40-year amortization and, if the year had been unfavorable, he paid less.

In the first year of the program there were 100 applications for each loan that could be made. The demand for these loans has continuously exceeded by far the number that could be made from the appropriated funds.

In 1943 the Farm Security Administration which administered the tenant-purchase program came under criticism in Congress. The criticism was directed principally against the few cooperative farms but the result was a reduction of the entire 1944-45 tenant-purchase appropriation to \$15,000,000.

With veterans of World War II beginning to return and some of them seeking to become established as farmers, Congress raised the 1945-46 loan authorization to \$50,000,000. One-half of this amount was earmarked for veterans. The same appropriation was authorized for 1946-47. In 1944-45 and 1945-46 only about two-thirds and one-half, respectively, of the authorized funds were actually loaned because of restrictions on the size and location of loans.

In the first nine years of the tenant-purchase program (to July 1, 1946), the total number of loans was equal to only 2% of the number of tenants listed by the census of agriculture for 1940. Thus it is evident that the tenant-purchase program has not as yet solved the problem of moving any large part of the tenant farmers into the owner class. However, besides helping a limited number of tenants to ownership, the program may have great importance as an experiment in 100% credit and as a first step toward a program which might assist much larger numbers of farm operators toward farm ownership.

The Farmers' Home Administration Act. The Farm Security Administration was superseded by the Farmers' Home Administration under the act of the same name which became law August 14, 1946. The loan experience under this new authorization has not been analyzed in this study, but the main provisions for loans are outlined here for purposes of general information and in order to permit a comparison of the present provisions with the program included in this investigation.

The Farmers' Home Administration Act abolished cooperative farms,²⁴ made some changes in the direct loan tenant-

²⁴ It went so far in this direction that a loan cannot be made to brothers to buy one large farm although separate loans could be made to them to buy two or more small farms.

purchase program, added an insured mortgage program, and gave some preference to veterans. The direct loan program has been broadened so that loans can now be made to improve and enlarge family-type farms and to refinance farms on which improvements and enlargements are being made.

Under the mortgage guarantee provisions the government may insure loans made by private lenders up to 90% of the appraised value of the farms. To be eligible for the mortgage guarantee the loan must meet the same eligibility requirements as apply to the direct tenant-purchase loans.

Borrowers with either type of loan made under the new act will pay $3\frac{1}{2}\%$ interest as compared to 3% under the Bankhead-Jones Act. On the guaranteed loans the lender gets $2\frac{1}{2}\%$ and the government 1%. The borrower must transfer his loan to regular lenders should he become eligible for such credit at prevailing rates (but not in excess of 5%) and terms in his area. Perhaps a more important change is that under the new act a borrower's repayment may be reduced in a bad year only by the amount he has previously paid ahead of schedule.

The Farmers' Home Administration Act authorized up to \$50,000,000 annually for direct tenant-purchase loans and a \$25,000,000 revolving fund to insure up to \$100,000,000 in loans by private lenders. For fiscal 1947-48 Congress appropriated only \$15,000,000 for direct tenant-purchase loans and \$1,000,000 for insuring private loans.

III. General Characteristics of Tenant-Purchase Loans

The tenant-purchase program is national in scope. This study, however, covers only the experience of Wisconsin borrowers. Some of the ways in which tenant-purchase loans in Wisconsin com-

pare with those elsewhere up to 1946 are as follows: (1) Loans in Wisconsin averaged \$6,947 compared with \$8,432 for the entire East North Central States and \$6,057 for the United States.²⁵ (2) Farms bought with tenant-purchase loans in Wisconsin averaged 108 acres as compared with 118 acres for the East North Central States and 140 acres for the United States.²⁶ (3) As of March 31, 1946 Wisconsin borrowers were paid 134% beyond what would have been due on a fixed repayment plan as compared to 51 to 119% for the other East North Central States and 59% for the entire United States.²⁷ The higher repayment rate in relation to the value of the farms bought in Wisconsin suggests that the size of business on Wisconsin farms may be larger relative to the value of the farms than in the other North Central States and the United States generally.

TABLE I—TENANT-PURCHASE LOANS, U. S. AND WISCONSIN CUMULATIVE TO JULY 1, 1946¹

	Number of Borrowers	Average Acreage per Farm	Average Loan
U. S. Total.....	40,632	140	\$6,057
East North Central States..	3,102	118	8,432
Wisconsin.....	672	108	6,947

¹ Information from *Agricultural Finance Review*, Nov. 1946; includes all direct government tenant-purchase loans including enlargement and supplementary loans, and loans from the early Rural Rehabilitation Corporation trust funds as well as the regular tenant-purchase loans under the Bankhead-Jones Act.

The average size of the tenant-purchase loans in Wisconsin was quite stable during the first six years of the program. This probably reflects the effort to hold the loans to the normal or long-time value of the farm. Loans made during the

²⁵ *Agricultural Finance Review*, November 1946. Bureau of Agricultural Economics, Washington. Appendix Table 4.

²⁶ *Loc. cit.*

²⁷ *Postwar Developments in Farm Security*, Annual Report of the Farm Security Administration for 1945-46, United States Department of Agriculture, Washington, Appendix Table III.

wartime years of 1941-1942 and 1942-43 were lower per farm and per acre than during any of the four preceding years, Table II.

TABLE II—AVERAGE SIZE OF TENANT-PURCHASE LOANS, AVERAGE ACRES PER FARM, AND AVERAGE LOANED PER ACRE, WISCONSIN: 1937-38 to 1942-43¹

Fiscal Year	State Average Size of Loans Dollars	State Average Acres per Farm Purchased	State Average Cost per Acre Dollars
1937-38	7,306	116	63
1938-39	7,999	145	55
1939-40	7,952	137	58
1940-41	6,993	132	53
1941-42	6,966	137	51
1942-43	6,211	130	48

¹ Tenant-Purchase Program Progress, Region II, F.S.A. June 30, 1943.

IV. Some Characteristics of Tenant-Purchase Borrowers in Wisconsin

For this study six counties were selected to represent Wisconsin: Fond du Lac, Dane, Grant, Pierce, Langlade, and Marathon. The intent was to get counties representative of the principal type of farming areas of the state; however, there were no early loans in the Central Sandy Area and few early loans in the Northern Area. The selection of the sample counties for this study was further limited by the need to get counties having relatively large numbers of borrowers whose loans had been in operation long enough to make the study of their experience informative. The first loans were made in 1938. For this study, only those borrowers were taken whose first repayment came not later than from their 1943 income. The latest repayment records at the time the data were taken were those from 1945 income. Thus the experience of the borrowers studied is of three to eight years' duration.²⁸

²⁸ All information on borrowers was secured from the loan and application records on file with the Farm Security Administration (now Farmers' Home Administration). This study was made possible by the helpful cooperation of the officials and employees of this organization.

This study is based upon the analysis of the records for 126 families. We recognize that a much larger number of cases is desirable. However, the total loans made in Wisconsin which had run for 3 to 8 years were necessarily rather small. For reasons of economy the investigation was limited to counties in which an appreciable number of loans were made. The findings of the investigation are intended to shed light on the possibilities of such a program as a general public policy.

With a liberal loan program such as this in which there may have been 100 applications for each loan made, the selection of the borrowers obviously may be a very important factor in the success of the program. The first set of questions to answer then, is: Who were the borrowers; how much capital did they have; and how did they compare with their neighbors?

Pre-Loan Net Worth. Net worth at the time of application for tenant-purchase loans offers one of the best simple measures of the previous progress of these farmers in capital accumulation. The average net worth of the borrowers in the six counties was \$4,309, Table III.

TABLE III—AVERAGE BEGINNING NET WORTH OF F.S.A. BORROWERS, 6 COUNTIES

County	No. of Borrowers	Average Net Worth
Fond du Lac.....	20.....	\$4,664
Dane.....	15.....	4,761
Grant.....	42.....	4,953
Pierce.....	32.....	3,536
Marathon.....	9.....	3,091
Langlade.....	8.....	3,659
Total.....	126.....	\$4,309

Borrowers in Marathon County were worth about \$3,000, while in Grant County the borrowers had assets of almost \$5,000. The net worth inventories were taken over the period of 1938 to 1942. These values are only slightly higher than the values of farm personal property reported to the 1945 census by

²⁹ In the Bureau of Personal Section of the Farm Security Administration of the search 1935-46, No

farmers in these same six counties on farms with more than 30 crop acres.²⁹

Taking the group as a whole, almost half of the borrowers had net worths of two to four thousand dollars, with 80% of the values falling between \$2,000 and \$6,000—Table IV.

TABLE IV—FREQUENCY DISTRIBUTION OF F. S. A. BORROWERS' BEGINNING NET WORTH

Net Worth	Number	Percent
\$0-\$1,999.....	5.....	4
\$2,000- 3,999.....	60.....	48
4,000- 5,999.....	41.....	32
6,000- 7,999.....	16.....	13
8,000 and over.....	4.....	3
Total.....	126.....	100

Two points are clear from this evidence:³⁰ (1) The F.S.A. tenant-purchase borrowers were not penniless. They were on the whole what we might call substantial tenants. However, (2) very few had any appreciable margin of equity to use in meeting the down payments on a strictly business type purchase of land.

These facts are consistent with the general purpose of the program; namely, to assist worthy tenants to become owners who were without sufficient capital to qualify for standard commercial financing, preference to be given to tenants who owned an adequate line of personal property.

Occupational History. Information relative to farm work prior to becoming a farm operator was not as complete as might have been desired. However, it appeared that nearly all of the borrowers were farm raised and had worked on farms operated by their parents prior to becoming operators on their own.

There was some indication that more of these men may have worked as farm laborers away from home than definitely reported it. Twenty-four percent of the borrowers in the lower net worth group reported having worked as farm laborers away from home as compared to only 15% for those in the upper net worth group.³¹ It does not necessarily follow that one accumulates capital more rapidly by not doing work away from home—either as a farm laborer or at nonfarm work. It may well be that those who stayed at home accumulated more; but those who worked away from home may have been using their best alternative. However, some of those who worked away from home might have been helped toward a more rapid capital accumulation by the use of family resources such as in father-son partnerships.³²

Tenure History. Borrowers with lower net worth had had somewhat less tenure stability than those with greater net worth. Of those in the higher net worth group 52% reported tenure on one farm only while only 42% of those in the lower net worth group reported the same. Moving from farm to farm of equal desirability probably is a handicap to capital accumulation. But we do not know whether those farmers who moved more frequently did so simply because they were "restless" and thus handicapped themselves, whether they moved to secure a better tenure situation, or whether the move was forced. There

²⁹ Persons interested in a more precise evaluation of the evidence in this study should consult the Ph.D. dissertation by Mr. Burkett on file in the Library of the University of Wisconsin.

³¹ The comparisons of higher and lower net worth in this section and the one following on tenure history use the value of farm personal property on typical farms in the area as a norm as developed in the Wilcox study referred to above.

³² See especially Parsons and Waples, *Keeping the Farm in the Family*, Wisconsin Research Bul. 157, and E. B. Hill, *Father and Son Farm Partnerships*, Spec. Bul. 330, Michigan Agr. Exp. Sta., East Lansing, April 1944.

³⁰ In a recent study by W. W. Wilcox, in cooperation with the Bureau of Agricultural Economics, the value of farm personal property was estimated for typical farms in various sections of Wisconsin. The average beginning net worth of the F.S.A. borrowers was generally below the value of personal property on the representative farms in the same part of the state during the year of the loan. Findings of this research published in part as "Typical Farms in Wisconsin, 1935-43," in *Economic Information for Wisconsin Farmers*, Vol. 16, Nos. 1-2, 1946.

may be some tendency for those who have less working capital to get the poorer tenure situations from which they may prefer to move or be forced to move. The availability of credit of a kind not primarily based on security should aid those less favored by family wealth to compete on more equal terms.

Stability of tenure may be partly due to fortunes of birth and marriage. Of those reporting tenure on only one farm 61% were renting of related landlords.³³ Among the lower net worth borrowers 57% of the one-tenure cases had related landlords while among the higher net worth borrowers 63% of the one-tenure cases had related landlords.

Eligibility requirements for borrowers favored tenants with sufficient capital to operate but not enough to buy a farm. A random sample of all farmers probably would show an even higher correlation between related landlords and higher net worth of tenants. There are several reasons why the tenant of the related landlord may have an advantage. The related tenant may have had a running start by being able to build up his herds and accumulate equipment on the home farm before becoming the nominal operator, he may get credit from the landlord, he may get a favorable rental agreement, he may be able to exercise more managerial freedom, and his greater tenure security enables him to make long-range plans. In short, he may have many of the advantages of ownership and he may have them without the burden of a real estate mortgage.

Age. The average age of borrower was 37 years, with a range in age from 24 to 56 years. Eighty-three percent of the borrowers were under 45 years of age. Table V. The borrowers from 35 to 44

years of age had relatively greater accumulations of capital before borrowing, than did either the younger or the older group.

TABLE V—NUMBER OF TENANT PURCHASE BORROWERS BY AGE RANGES, 6 COUNTIES, WISCONSIN

County	Under 35 Years	35 to 44 Years	45 Years and over	County Total
Fond du Lac.....	6	10	4	20
Dane.....	7	6	2	15
Grant.....	17	18	7	42
Pierce.....	11	16	5	32
Marathon.....	5	4	....	9
Langlade.....	3	2	3	8
All counties, Total.	49	56	21	126
All counties, Percent of total.....	39%	44%	17%	100%

Education. The great majority of the borrowers had only an eighth grade education or less; the average years' schooling for the men was 8.5 years. The wives of borrowers had about 1.5 years more of formal school training than their husbands, averaging 9.9 years in school. However, for the wives, as well as their husbands, the most frequent school training was eighth grade or less. Twenty percent of the wives went beyond high school; less than a third as many husbands had as much schooling.

TABLE VI—EDUCATION OF BORROWERS, TENANT-PURCHASE LOANS, 6 COUNTIES, WISCONSIN

Years in School	Husbands (No.)	Wives (No.)	Husbands (Percent)	Wives (Percent)
0-8 years....	89	64	70	51
9-12 years....	30	36	24	29
13-16 years....	7	25	6	20
Total.....	126	125	100	100

Size of Borrowers' Families. The borrowers had an average of 4.5 persons per family at the time of securing the loan. Among these, 25% of the families had sons 14 years old or over; 6% had other male workers, such as brother-in-law, uncle or father-in-law. Altogether 17%

³³ These are understatements of percentages since relatedness to the landlord was inferred to occur only when the two parties were of the same name or when relationship was incidentally mentioned in the case records.

of the families had some male help over 18 years of age. A somewhat smaller proportion had daughters and other female help in the household, Table VII.

TABLE VII—SIZE OF BORROWERS' FAMILIES AND NUMBER OF FAMILIES WITH WORKERS OF SPECIFIED CHARACTERISTICS

		Percent of families
Average number of persons per family.....	4.5.....	
Number of families.....	126.....	100
<i>Number of families with sons</i>		
14 to 18.....	18.....	14
18 and over.....	14.....	11
<i>Number of families with daughters</i>		
14 to 18.....	14.....	11
18 and over.....	13.....	10
<i>Number of families with</i>		
Other male workers.....	8.....	6
Other female workers.....	5.....	4

V. Progress Toward Loan Repayment

This study has taken 1946 as the bench mark, since records for this year were the latest available at the time of the investigation. Our analysis is confined to the borrowers who secured loans during 1938 to 1943. Consequently the 126 borrowers, whose records are analyzed, had had from 3 to 8 years in which to make repayments.

To summarize repayment records to January 1, 1947: Out of the 126 borrowers, 5 borrowers sold their farms to other parties, 23 repaid their loans in full by January 1, 1946, 98 borrowers, the remaining active cases, were paid ahead of schedule an average of 7.3 years, on January 1, 1946,³⁴ and 21 of the 98 above repaid their loans in 1946.

Advance payments on loans were general throughout the state. In none of the six counties on January 1, 1946, were loans paid ahead less than 6 years, on the average. Borrowers in Dane County were paid furthest ahead—almost 11 years. Only one loan was delinquent on January 1, 1946, and this to a negligible amount only—the borrower having paid

96% of the total amortization repayments due to date.

None of the loans were repaid in full before 1944. It was the high incomes of this and subsequent years which enabled these farmers to repay their loans at such a rapid rate.

VI. Elements in the Varied Rates of Repayment

Practically all of the borrowers were doing well in the 1938 to 1945 period as measured by meeting their tenant-purchase payments on a 40-year amortization basis. But there were marked variations in the rate at which individual borrowers were repaying their loans. The later years (1941-45) of the period studied were unusually prosperous ones for farmers. Should periods of normal or below-normal income recur, these differences in repayment rates³⁵ could make the difference between ability or inability to meet the annual 40 year amortization payment.

Some Started with More Capital of Their Own. The borrowers with the largest net worth at the time of borrowing have made the greatest financial progress. Although this is not surprising, it may be significant that the families with at least \$2,000 initial capital had potential repayment of three times the loan obligations; those with at least \$6,000 beginning net worth had a repayment potential at

³⁴ More technically the borrowers had paid ahead an amount equal to 7.3 times the required amortization payment for one year.

³⁵ Repayment ability was determined by subtracting farm operating costs, family living expenses, capital expenditures, and payment on non-real estate debts from earned cash income. Potential repayment rates were then determined by dividing the sum of funds available for tenant-purchase payments over the record period by the sum of the 40-year amortizations falling due during the same period. If the potential repayment rate is 200 this means the borrower apparently could have repaid at twice or 200% of his 40-year rate. Potential repayment is not the same as the actual payments made. The framework for focusing the data on the problem is provided by the basic theoretical proposition that farmers can pay for farms bought 100% on credit in normal times if their wages of labor and management are sufficiently above their living costs to leave enough for the necessary farm principal payments.

least four times the contracted amortization payments.³⁶

Size of Farm. A farmer in debt for the full value of his real estate would, under a situation where land was priced at its true

TABLE VIII—POTENTIAL REPAYMENT RATES OF BORROWERS ACCORDING TO BEGINNING NET WORTH, 6 COUNTIES, WISCONSIN

Beginning Net Worth	Number of Borrowers	Index of Repayment Potential ¹
\$0-\$1,999.....	5.....	205
\$2,000-\$3,999.....	60.....	318
4,000- 5,999.....	40.....	364
6,000- 7,999.....	14.....	411
8,000 and above.....	4.....	457
	123	343

¹ See footnote 35 supra.

earning capacity, have only wages as laborer and manager and the investment earnings on his personal property as a source of saving for debt retirement. This limited margin for savings should place a marked emphasis upon the best size of operating unit. As a first approximation to a measure of the best size of farm under a 100% land purchase loan, the debt repayment margin (the potential discussed above) was compared with the value of the farm purchased. There is some indication that the borrowers who acquired farms (real estate) valued from \$6,000 to \$10,000 made greater financial progress than those who bought either smaller or larger farms, Table IX.³⁷ These farms where the rate of financial progress was greatest were usually around 120 to 160 acres in size; this is approxi-

³⁶ The experience of borrowers tends on the whole to be consistent with the idea that it is better to borrow sufficient money to acquire an adequate line of farm personal property than to farm with less equipment. The evidence indicates that farmers with a small beginning net worth were not handicapped by a debt offset by a better array of livestock and equipment. Several of the borrowers indebted for personal property made better financial progress than other borrowers of comparable net worth but without such debts. However, no strong conclusion on this point can be drawn from the evidence in this study.

³⁷ Statistical tests of the significance of the differences between the average repayment potentials by value of farm do not show decisive differences. However, the repayment potentials of these middle-valued farm groups are appreciably higher than classes above and below these two mid-values, which also include a considerable number of items.

mately the typical size for dairy farms in Wisconsin.

The borrowers with the lower beginning net worth bought somewhat smaller farms on the average than those with greater resources. Of the 38 farmers in the six counties with the lowest finan-

TABLE IX—POTENTIAL REPAYMENT RATES OF BORROWER, ACCORDING TO VALUE OF FARM PURCHASED, 6 COUNTIES, WISCONSIN

Value of Farm Purchased	Number of Borrowers	Index of Repayment Potential
Below \$4,000.....	4.....	382
\$ 4,000 to 5,999.....	32.....	322
6,000 to 7,999.....	29.....	372
8,000 to 9,999.....	27.....	366
10,000 to 11,999.....	24.....	309
12,000 and more.....	7.....	329
	123	343

cial worth³⁸ two-thirds bought farms of less than 120 acres in size. Only 45% of the borrowers with higher net worth bought farms as small. Table X.

Not only did the farmers with the higher net worth buy larger farms, their subsequent financial progress was more rapid than the farmers with less beginning capital of their own. This is true whether borrowers with lower and higher net worths are compared on the same sized farms or in the aggregate. On the basis of over-all average comparison, the index of the repayment potential of the higher net worth group was about 20% greater than for the poorer farmers.³⁹

It should be remembered in interpreting these experiences that the borrowers all went into debt for the full value of their farms. An increase in previously accumulated capital influenced the relative position of these borrowers directly by enabling them to have a more adequate line of livestock, operating equipment and possibly liquid

³⁸ See footnote 1 to Table X for explanation.

³⁹ This difference between higher and lower net worth groups is highly significant statistically. However, the differences between the average repayment potentials within the two net worth groups show less significance statistically. This may be due to the fact that the comparison is based upon total acres rather than crop acres per farm.

TABLE X—REPAYMENT POTENTIAL OF TENANT PURCHASE BORROWERS CLASSIFIED ACCORDING TO SIZE OF FARM PURCHASED AND BEGINNING NET WORTH IN WISCONSIN COUNTIES

Size of Farm Purchased	Lower net worth ¹			Higher net worth ¹		
	Number of Borrowers	Index of Potential Repayment Rate	Percent of Group	Number of Borrowers	Index of Potential Repayment Rate	Percent of Group
Under 80 acres.....	10	279	26	14	394	17
81-120 acres.....	15	282	40	24	350	28
121-160 acres.....	7	288	18	28	408	33
161-200 acres.....	6	244	16	11	343	13
Over 200 acres.....	..	...	...	8	298	9
Total or Average.....	38	283	100	85	370	100

¹ Higher net worth begins at \$4,000 in Fond du Lac, Dane and Grant counties, and at \$3,000 in Pierce, Marathon and Langlade counties.

funds. This in turn apparently influenced to some extent the size of the farms chosen or the size of loans allowed.

Age of Borrower, Net Worth, and Repayment. Taking the group as a whole the younger borrowers had larger debt paying capacity than the older ones, Table XI. Farmers past 40 had substantially lower repayment potentials than those in their twenties. However, when account is taken of the net worth of the borrowers, the interpretation must be qualified somewhat.

Among the farmers with the lower net worth, the decline in repayment capacity with age was most striking. Evidently, the younger men were able to work harder and thus better overcome the relative handicap of the use of a smaller

amount of equipment and operating capital. Considering the farms with the higher net worth, the farmers in their thirties evidently did the best job of farming, earning the widest margins for potential debt repayment.

Two inferences may be drawn with considerable assurance: (1) the borrowers with the highest net worth at the beginning of the loan have made greater progress; (2) where farmers were shortest of capital the influence of their own age appears to have been significant. Younger farmers were more able to offset the capital deficiency by hard work. In fact farmers in their twenties with the lower net worth had repayment potentials of approximately the same rate

TABLE XI—POTENTIAL REPAYMENT RATES OF BORROWERS ACCORDING TO AGE AND BEGINNING NET WORTH¹

Age of Borrowers	Total		Lower Net Worth		Higher Net Worth	
	No.	Repayment Potential	No.	Repayment Potential	No.	Repayment Potential
20-29 years.....	23	362	12	382	11	341
30-39 years.....	50	355	20	289	30	398
40 years and over.....	50	323	24	270	26	372
Total.....	123	343	56	301	67	379

¹ The dividing line between higher and lower net worth here was taken at a value which would divide the group of borrowers into approximately equal groups. It is different therefore than in Table X. The class averages for the lower net worth group are significantly different, statistically speaking, as is the difference between the total groups of higher and lower net worth.

as the farmers with higher beginning net worth.

Education and Debt Repayment Potential. The evidence is less conclusive on the significance of education in the debt repayment margin, than for some other elements. There is a suggestion that the few borrowers who had gone beyond high school (this includes all kinds of schooling) made the poorest showing. Table XII. It is probably much more significant that the borrowers 30-39 years

of age, with 9 to 12 years of schooling (approximately some or all of high school course) had the largest margin for debt repayment; the repayment potential for this group of borrowers was 406. When this fact is noted in connection with the relative progress according to age and net worth (Table XI), it is more evident that the best records were made by farmers in their thirties who had both greater than average initial net worth and some high school training.⁴⁰

TABLE XII—EDUCATION AND DEBT REPAYMENT: POTENTIAL REPAYMENT RATE OF BORROWERS CLASSIFIED ACCORDING TO YEARS OF EDUCATION AND AGE

Years in School	Borrowers of All Ages		20-29 Years		30-39 Years		40 Years and Over	
	No.	Repayment Potential	No.	Repayment Potential	No.	Repayment Potential	No.	Repayment Potential
To 8th grade or less.....	86	348	16	387	30	339	40	339
9 to 12 years (high school).....	30	346	6	318	16	406	8	249
More than 12 years (some work beyond high school).....	7	258	1	230	4	262	2	262
Total.....	123	343	23	362	50	355	50	321

Interpretation. By way of summary, it is quite clear that the farm families in the strongest competitive position made the greatest financial progress. But it is likely that the more important interpretations, for purposes of public policy, are those that may be drawn from the more marginal cases: The evidence suggests that financial success becomes more doubtful where borrowers have less than \$2,000 under 1940 conditions; or are much past 40 years old; or are educational misfits. Undoubtedly a strong physique and unusual farming ability can offset to a considerable degree a lack of initial financial capital.

VII. An Estimate of the Influence of Wartime Prices

The borrowers in the tenant-purchase program in Wisconsin have met their

loan obligations and more. Their progress has been striking—but by no means uniform. Only one of them was delinquent by a single dollar in 1946 and many had completely repaid their loans. In the last section we have attempted to analyze some of the elements in the different rates of repaying the loans. We

⁴⁰ Interested readers may wish to refer to the more exhaustive analysis of the differential rates of repayment in Mr. Burkett's dissertation, Chap. VII, pp. 207 to 298. It is recognized that in the interpretation of this table one can raise many questions which cannot be answered from these few data. Possibly those with more than high school training had been more unfortunate than the others in their pre-loan experience; possibly they are misfits. Also one wonders why farmers in their twenties with the least education should have done appreciably better than those in their thirties with 8th grade schooling only. Is this another evidence of the power of a strong back or is it a matter of selection of the borrowers? Like the other tables in this section, Nos. 8 to 11, further research is needed to establish the points definitively. But the inferences have been drawn carefully and presented in the hope that other investigators might test them in other studies.

come now to the more difficult question: Would the loans have been repaid under more usual conditions—times like those in which the program was conceived and initiated, 1937 to 1940.

First Approximation: Suppose prices and costs had remained at the 1935 to 1939 level? Prices have gone up strikingly during and since the war. Suppose we adjust for these changes by use of price indexes? We have such indexes for Wisconsin agriculture, Table XIII. Between 1938 and 1945 prices received by Wisconsin farmers doubled; prices paid increased by 44%.

TABLE XIII—INDEX OF PRICE CHANGES, 1938-45¹
(1935-39 = 100)

Year	'38	'39	'40	'41	'42	'43	'44	'45
Prices received by Wisconsin farmers....	95	88	95	123	151	182	184	190
Prices paid by Wisconsin farmers.....	99	97	98	104	122	133	139	143

¹ Calculated from indexes in the *Wisconsin Crop and Livestock Reporter*, Federal-State Crop Reporting Service, Vol. XXVI, No. 6, June 1947, p. 5. Indexes of prices received by Wisconsin farmers are calculated from the series called "Wisconsin farm prices." Indexes of prices received by Wisconsin farmers were calculated from the series called "Retail prices paid by Wisconsin farmers for commodities used in production and family maintenance." In both cases 1935-39 indexes were the base and 1938 to 1945 indexes are percentages of the average for the base.

An adjustment was made in the financial records by dividing each of the income and expenditure items of the borrowers by the appropriate index number: supposing, simply, that the actual performance of these farm families—production, consumption, purchase of equipment, etc.—would have been with the lower prices just what they were with the higher prices.

The results of this computation were somewhat startling. Under these conditions tentatively supposed, only one sixth of the borrowers would have had sufficient margin between income and expenses to have met their farm ownership loan payments⁴¹ in full. Table XIV. An additional 26% would have been able to pay something. But 57% would have had nothing to pay on their loans,

many of them falling far short of making ends meet.

TABLE XIV—FIRST APPROXIMATION TO REPAYMENT ABILITY UNDER NORMAL PRICES: ADEQUACY OF FUNDS AVAILABLE FOR TENANT-PURCHASE LOAN REPAYMENTS, UNDER DEFLATED PRICES

Percentage of loan obligations covered by estimated funds available	Number of borrowers	% of total number
A. Borrowers with some margin for debt repayment		
300% or more of amount due..	2	1.7
200% to 299% of amount due..	2	1.7
100% to 199% of amount due..	16	13.2
0 to 99% of amount due.....	32	26.4
Subtotal (A).....	52	43.0
B. Borrowers with no margin for debt repayment, deficit as percentage of amount due		
0 to -99% of amount due	41	33.9
-100 to -199% of amount due	20	16.5
-200 to -299% of amount due	6	5.0
-300 to -399% of amount due	1	0.8
-400% or more of amount due	1	0.8
Subtotal (B).....	69	57.0
Total.....	121	100.0

These figures should not be taken to mean that the plight of borrowers would have been hopeless unless wartime price rises had occurred. No doubt many of these families would have found ways to meet their loan obligations—by doing something different under the less favorable circumstances.

As a second approximation to an answer to our question of just how the borrowers would have fared under more normal price conditions, we shall study in some detail the actual income and expenditures of eight Grant County borrowers. Each of these farm families had a loan running from 1940 onward, so that we have financial records on their

⁴¹ The measure of repayment ability used here is the same as in the previous section; which in turn is essentially that used by the Farm Security Administration in computing the (variable) annual installment due on the loan; gross farm income less (a) farm operating expense, (b) family living expenses and (3) net debt (other than the farm ownership loan) payment and capital expenditures.

farms as going concerns from 1940 to 1945.⁴²

Second approximation: analysis of records of eight borrowers 1940 to 1945. The analysis of the income, expenses, and general performance of eight Grant County borrowers will help us get a

better idea of how much loan repayment margin borrowers might have under ordinary conditions. This analysis will be carried through step by step, then the conclusions will be taken as suggestions which may be applied to the whole group of borrowers.

TABLE XV—STEP 1 : THE ACTUAL INCOME AND EXPENSE RECORDS OF EIGHT GRANT COUNTY BORROWERS 1940-1945 (average per farm)

ITEM	1940	1941	1942	1943	1944	1945
Gross farm income.....	\$3,796	\$5,780	\$6,759	\$7,837	\$7,825	\$8,421
Farm operating expenses.....	1,273	1,799	2,425	3,401	3,082	3,571
Net farm income.....	2,523	3,981	4,334	4,436	4,743	4,850
Less:						
Family living expenses.....	964	1,201	1,783	1,849	1,764	1,941
Outlay for equipment, other capital and payment of non-real estate debts ¹	\$853	1,817	1,679	1,670	1,404	2,061
Amount available for tenant-purchase debt retirement.....	706	\$ 863	\$ 872	\$ 917	\$1,575	\$ 848

¹ This is approximately equal to outlay for the purchase of livestock and farm equipment.

On the basis of the actual record of these eight farmers there was a substantial surplus available each year, which might be applied on the loan from the Farm Security Administration, Table XV. The aggregate margin for the 6-year period was \$5,781 per farm; the average amortized obligation on the farm ownership loans was \$440 per year;—or \$2,640 per farm for the 6-year period.

When the simple adjustments are made for changes in price level, as discussed above, the margin for debt repayment of these eight farmers completely disappeared, Table XVI. Assuming the same performance, in physical terms, these borrowers would have been faced with a deficit of \$1,899 during the 6-year period with nothing available toward meeting their obligations on their F. S. A. loans.

⁴² It is necessary to deal with a few farms, as a case study, since we must have continuous records over the entire span of at least six years; during the early years of this period few loans were being made—and after 1944 several were being paid off, consequently the records for the whole group of borrowers are not suitable for detailed analysis of the influence year by year of price changes.

We are now in a position to ask more specific questions about just why this deficit shows up in our calculations and how and to what extent farm families might reasonably expect to avoid these deficits under ordinary times, with 100% tenant purchase loans.

It is evident that those eight farm families not only increased their output, but to an even greater extent their operating inputs (expenses) as well as their standard of living, and other real expenditures, Table XVII. One may reasonably ask how much difference would there have been if the farm families had not increased the level of living during this period and had kept their real investment in capital and debt retirement at the 1940 level. This computation is shown in Table XVIII.

On the basis of these adjustments, each of these eight families would have had an average margin of \$2,388 over their other expenses available for debt payment even at 1935 to 1939 prices. This is \$252

TABLE XVI—STEP 2: INCOME AND EXPENSE RECORDS OF EIGHT GRANT COUNTY BORROWERS, 1940 TO 1945, ADJUSTED FOR CHANGES IN PRICE LEVEL¹
(average per farm)

ITEM	1940 ²	1941	1942	1943	1944	1945
	\$	\$	\$	\$	\$	\$
Adjusted gross farm income.....	3,796	4,480	4,476	4,306	4,307	4,211
Adjusted farm operating expenses.....	1,273	1,697	1,988	2,557	2,325	2,446
Adjusted net farm income.....	2,523	2,783	2,488	1,749	1,982	1,765
Less:						
Adjusted family living expenses.....	964	1,155	1,371	1,390	1,269	1,357
Adjusted outlay for capital and debt payment.....	853	1,747	1,376	1,256	1,010	1,441
Adjusted amount available for tenant-purchase debt retirement	706	-119	-259	-897	-297	-1,033

¹ Indexes used shown in Table XIII above.² The actual income and expenses for 1940 are used since prices in the year were approximately the same as during 1935-1939.

less than the \$2,640 due for the six years on the tenant-purchase loan. This means that these farmers could have operated their farm business at 1935 to 1939 prices, exactly as they did during 1940-45 and still have almost met their loan obligations, holding the standard of living and other debt payment and investment programs to the 1940 level.

There is a strong suggestion in the record of these farmers, see Table XVI, that it would have been more profitable at 1935 to 1939 prices to have operated at a level of intensity different from the one actually followed during the high prices of 1942 to 1945. It is at least interesting to note that a simple process of price deflation to compute farm costs and returns at 1935 to 1939 prices shows the farmers with reduced returns in the

later years when prices were much higher. One possible explanation⁴³ is related to the fact that the index of inputs, Table XVII, rose much more sharply than did the index of output, with the consequence that the increase in output above 1940 would not actually be profitable at 1935-1939 prices, with the actual practices used during the later war and postwar years.

The more rapid rise of inputs than output as prices rose from 1940 to 1945 may have been due to either or both of these possibilities: (1) because prices of farm products were rising more rapidly than prices of things going into farm production it was good business to increase output even at a greater percentage increase of inputs; (2) farmers may have

⁴³ Assuming the index numbers reflect accurately the changes in prices to these farmers.TABLE XVII—STEP 3: TRENDS IN PHYSICAL VOLUME OF FARM OUTPUT AND INPUT; FAMILY LIVING AND ADDITIONS TO OPERATING CAPITAL¹; EIGHT GRANT COUNTY BORROWERS, 1940-45
(1940=100)

ITEM	1940	1941	1942	1943	1944	1945
Trend in output.....	100	118	118	113	113	111
Trend in input (farm operating expenses).....	100	133	156	201	183	192
Trend in family living.....	100	120	142	144	132	141
Trend in capital additions (including debt retirement).....	100	205	161	121	118	169

¹ These are the indexes of estimated changes in physical volume computed from the actual income and expenditures adjusted for changes in price level. The index of capital additions is less precise in meaning than the others but it is sufficiently exact for these rough estimates.

TABLE XVIII—STEP 4: ADJUSTMENT FOR INCREASES SINCE 1940 IN THE STANDARD OF LIVING AND CAPITAL AND DEBT OUTLAY

	1940	1941	1942	1943	1944	1945
Adjusted amount available for payment on tenant purchase loan.....	\$ 706	\$-119	\$-259	\$-897	\$-297	\$-1,033
Allowance for increase in standard of living.....		191	407	426	305	393
Allowance for increase in capital and debt outlay.....		894	523	403	157	588
Funds available for tenant-purchase loan payment, these conditions.....	\$ 706	\$ 966	\$ 671	\$ -68	\$ 165	\$ -52

become somewhat careless about their costs or inputs as prices for farm products climbed, making desirable but unnecessary expenditures. But regardless of the explanation, it is quite clear that the farmers would have a greater debt-paying capacity at 1935-to-1939 prices if they operated at 1940 or 1941 levels and combinations rather than what they actually did. Consequently the fifth and final step in working out our estimates of debt repayment capacity at 1935 to 1939 prices is to be made by allowing for this evident diseconomy of farm operations in 1942 to 1945.

According to these computations the farmers may have had an additional margin for greater income from farm operations under 1935-to-1939 price conditions by changing their input-output ratios and combinations in 1942 to 1945.

Operation at the 1940-level in these latter four years would have yielded an additional \$1,930; if the 1941 cost-returns combination had been realized the additional revenue would have been \$3,715 during this same period.

Third approximation: A general estimate of repayment capacity of all borrowers under normal conditions. The detailed analysis of the debt repayment capacity of eight Grant County farmers indicates that there were sufficient margins in the increased standard of living of the families, capital and debt outlay and diseconomies of operation in the latter years to have permitted them to have more than met their loan obligations at 1935-to-1939 prices. Considering only the evident increase in standard of living and the additional (real) operating expenses,

TABLE XIX—STEP 5: ADJUSTMENT FOR DISECONOMIES OF OPERATION

	1940	1941	1942	1943	1944	1945
(1) Funds available for tenant-purchase loans, at 1935 to 1939 prices, assuming no increase over the 1940 level in standard of living, assuming actual production inputs, or operating expenses ¹	\$ 706	\$ 966	\$ 671	\$ -68	\$ 165	\$ -52
(2) Additional fund available for tenant-purchase loan payments, same condition as (1) except that operations in 1942 to 1945 at 1940 level of intensity and combinations.....			35	756	541	598
(3) Additional funds available for tenant-purchase loans if operations in 1942 to 1945 were at 1941 level of intensity and combination.....			482	1,202	987	1,044

¹ Same as total, Table XVIII.

investment in capital equipment,⁴⁴ and debt outlay, a holding fast to the 1940 level of expenditures would have permitted enough saving to have met the amortization payments on their tenant-purchase loans. A similar analysis of six Grant County borrowers who repaid their loans in 1943 leads to the same conclusion. Likewise a study of four cases in Langlade County with loans in operation in 1940 to 1945 leads to substantially the same conclusion.

When generalization is made from these few experiences, it is evident that the borrowers could have made such adjustments in their expenditures, if forced to operate under 1935-to-1939 price conditions, as to have made substantial repayments possible. When correction percentages derived from the few cases were applied to the others it seemed probable that most (about 93%) of the borrowers could have repaid the loans under normal price conditions. The percentage was higher in some of the southern counties and lower in some of the northern counties.⁴⁵

It is recognized that this somewhat tedious argument is not altogether satisfying. However, in the nature of the case it has been necessary to estimate what might have been reasonable courses of action for F.S.A. borrowers under drastically different conditions. The conclusion seems thoroughly warranted that most of the borrowers would have been able to meet their loan obligations under normal conditions. Actually the wartime and postwar prosperity has enabled

the borrowers to meet their obligations far ahead of schedule and at the same time greatly improve their standard of living and settle other debts and increase their physical operating capital.

Human affairs being what they are, only an experiment in normal times can conclusively answer the question of whether and to whom 100% credit loans are feasible; but there are reasonable grounds to conclude that most of this same group of Wisconsin farmers would be able to meet their loan obligations in such a program under stable peacetime prices and the level of prosperity of 1935 to 1940.⁴⁶

We conclude, therefore, that the successful repayment experience on the 100% tenant-purchase loans in Wisconsin is not to be explained entirely in terms of wartime prosperity. If further investigation supports our tentative conclusions, a broadening of the tenant-purchase type program and a wider use by other lenders of credit terms approaching those used in the tenant-purchase program seem justified. "Tenant-purchase type credit

⁴⁴ This conclusion would also seem applicable to conditions similar to those of Wisconsin. Further research is desirable to check the theoretical suggestion that paying off a 100% loan may be more difficult in areas where farm values are higher relative to farmers' labor and management incomes. The authors would also like to recognize briefly comments of some reviewers. One comment was that we may not have given sufficient recognition to management assistance rendered by the F.S.A. We would not want to under-rate the value of this assistance to the borrowers studied, but may there not be the possibility that in the future the responsibility for farm plans, etc., could be placed largely on the carefully selected borrowers?

Another comment was that the loans may have been successful because the farms were bought cheap. A major part of the study was concerned with determining what would have been the borrowers' ability to pay had farm product prices and cost remained at the 1935-39 level. We did not, however, try to determine whether land prices in 1938-43 bore a "normal" relationship to 1935-39 land earnings or whether tenant-purchase farms were bought at less than prevailing land prices. Since the great depression of the 1930s was in the fairly recent past, land values may have been lagging behind land earnings. We may point out, however, that the use of 1935-39 product prices and costs and 1938-43 farm purchase prices allowed for some lag. The prices of Wisconsin farm products averaged 22% higher for 1938-43 than for 1935-39.

⁴⁵ The computations of real investment made herein are based on expenditures; it does not take account of possible increases in capital produced on the farm, such as the raising of cattle.

⁴⁶ For more detailed analysis of the methods of arriving at this conclusion, consult the dissertation of Mr. Burkett in the University of Wisconsin Library. The estimate of 93% assumes the 1941 input-output combination, the 1940 standard of living, and the (higher) 1941-45 level of capital investment.

terms" is meant to include the general features of "normal value" appraisal, long repayment period, variable repayment plan, estimated repayment ability, selection of borrowers on the basis of

character and farming ability, and perhaps annual farm plans and records, as well as a loan nearer to full appraised value of the farm than has been the usual practice.

Conference on City and Regional Planning

The University of Wisconsin has lent its sponsorship to a Conference on City and Regional Planning, being held May 17-19, on its campus. The program listed below gives some indication of the scope and area of the discussions. This *journal* will publish, in future issues, the findings of the conference as well as one of the principal addresses.

Contours of Our Economy in the Coming Decade—Address by Roy Blough, Council of Economic Advisers to the President

Urban Redevelopment Reconsidered—Seminar led by Coleman Woodbury, Urban Redevelopment Study, Chicago

Prospects and Emphases in Local Planning in the Fifties—Discussion led by Walter Blucher, Executive Secretary, American Society of Planning Officials

Industrial Location in a Continuing Period of National Emergency—Seminar Richardson Wood, Richardson Wood and Company, New York

Professor Albert Lepawsky, Southern Regional Training Program, University of Alabama

National Security and the Location of Industry and Population—Address by Hugh Pomeroy, Director of the Westchester County (New York) Planning Commission

The St. Lawrence Seaway and Its Regional Significance—Discussion led by Harry C. Brockel, Municipal Port Director, Milwaukee

Herbert Naujoks, Attorney, Chicago

Walter P. Hedden, Director of Port Development, Port of New York Authority

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Reports and Comments

II.—A Water Policy for the American People: A Commentary

READERS of this *journal* have already had the benefit of comments in the February issue¹ on this outstanding report of the President's Commission² as it related to the non-public utility aspects of water resource development. This review will be concerned primarily with policy recommendations as they bear upon problems associated with navigation, water supply, and hydro-electric power as joint products of multiple-purpose projects. However, a few observations regarding the general make-up and value of the report will be offered as a preliminary.

The study, now grown to three volumes, covers in Volume 1 the report proper with technical appendices; in Volume 2 a survey of the river basins important for America's future;³ and in Volume 3 a convenient summary of the law relating to water resources. As a whole, the documents reflect a tremendous effort on the part of the commission and its cooperating research staff to present the many-faceted problem in considerable detail. Much valuable material of an objective and scientific character has been brought together in an amazingly short space of time. It may well serve as a mine of information for students of this far-flung subject matter in the future. Having been hurriedly compiled and representing the cooperative effort of many different persons and official organizations, there was bound to be considerable repetition and unevenness of quality in the presentation. Nevertheless, the outline of the report itself is well integrated and the

chapters supplied with summarizing recommendations. In most respects these recommendations represent definite formulations of policy; there is not much pussy-footing. On the other hand, it should be said—though it need not derogate from the importance of the report—that there is not much evidence of the clash of opposing opinions. The members of the commission are substantially of the same opinion; perhaps they were so at the outset of their investigation. It is, therefore, a water policy for the American people as formulated by only one segment of public opinion, however important that segment may be.

Since the commission was able to draw upon the resources of many governmental agencies, some having long association with the problems with which they were concerned, the three volumes contain much statistical and historical material, charted, pictogrammed and pictured in great profusion. This was not the least valuable part of the commission's work. It is well to have the scientific resources of the country converge upon the discussion of the most fundamental aspects of the conservation of our natural resources.

Space will not permit a detailed summary of what is in these volumes upon a subject so germane to the problem area to which this *journal* is dedicated. Its readers should see for themselves.

Navigation. In dealing with waterways the report asserts that there are certain parts of the total transportation job which can be better and more cheaply performed by inland navigation. Tying up with the federal declaration of policy in the Transportation Act of 1940 that regulation should recognize and preserve the "inherent advantages" of each form of transport, the commission recommends that "the nation should continue the improvement of its inland and intracoastal waterways to standard depths as an important

¹ Raymond J. Penn, "A Water Policy for the American People: a Commentary," *Land Economics*, February 1951, pp. 76-79.

² The Report of The President's Water Resources Policy Commission, *A Water Policy for the American People*, Vol. I (Washington 25, D. C.: U. S. Government Printing Office, 1950), pp. 445. There are also two supplemental reports: Vol 2, *Ten Rivers in America's Future* (reviewed by Henry C. Hart in this *Journal*, first page of Book Reviews) and Vol. 3, *Water Resources Law* (to be reviewed in the August 1951 issue of this *Journal*.)

objective of comprehensive basin programs." At this point the suggested policy breaks with the historic past. Instead of regarding waterways as competitive with other forms of transport, the contention is that they should be "considered as complementary" and "integrated into a broader program designed to provide an economical and efficient coordinated transportation system" including all other forms of transport. This would have to mean that railroads should cease charging discriminatory rates paralleling waterway rates.

After reviewing the historical development of our waterways, the report lists the elements of the present and of a proposed waterways system which the Army Engineers are proposing as giving promise of important benefits. The commission disclaims any intent to express an opinion as to the "merits of any of these projects." Included as one of the elements is the St. Lawrence Seaway. Next the report brings together in some detail estimates of savings in transportation costs by water as compared with railroad costs made by both the Army Engineers and by the Federal Board of Investigation and Research. The conclusion is that "bulk freight can be transported on modern river channels at a cost one-half or less of the average cost by railroads" (p. 203) while package freight costs are only "relatively favorable." However, the commission concedes that the comparisons are open to the objection that "nothing is added for the free use by the water carriers of the channels constructed by the Government at the general taxpayers expense." This consideration, coupled with the fact that regulatory procedures permit railways to meet this competition with non-compensatory rail rates, makes difficult the attainment of a situation where "each of the modes of transportation may have an equal opportunity to compete for traffic on the basis of economic standards of relative cost and quality of service." It is for this reason that the Commission recommends that railroads not be permitted to meet water competition, and that a system of user charges or tolls be worked out so that rates for all forms of transport be based on full costs. This, it is asserted, will permit the economic development of traffic by all the forms of transport, and railways will gain from "indirect benefits" because "waterways create more traffic than they take away."

With respect to its recommendation for the imposition of waterway tolls, the commission warns that these charges "should be based on the mature use of the waterway after the full volume of traffic has developed and that exemptions may have to be granted for an initial period of development."

Finally, to implement these suggested changes in policy would require additional legislation by Congress and the conduct of broad studies relating to federal transportation policies and programs by the recently appointed Under Secretary of Commerce for Transportation.

Water Supply. The least controversial section of the report relates to the provision of a water supply for domestic and industrial purposes to the sixty percent of our population living in cities. The increasing competition of these urban areas for water supply either surface or underground, their concern as to its quality and quantity as affected by other uses, by diversions, and by pollution, are a result of the increasing urbanization of our people and their concentration in metropolitan groupings.

Interesting and enlightening details are given as to the history of waterworks, as to the low cost per capita achieved with complete liquidation of expenditure, as to the increasing and relative requirements for different purposes, and as to the problems arising in connection with the supply to industries which have too often taken water for granted. Of the 15,400 waterworks in the United States, about 80% are municipally-owned. Although much information is available for individual units, the report notes the absence of comprehensive nation-wide data and this is reflected in the paucity of statistical summaries.

Although municipal water supply should continue to be primarily a local responsibility, it is recommended that states authorize the formation of metropolitan water districts on the model of the Metropolitan Water District of Southern California. As a non-contiguous area, this legal entity makes possible the co-operation of cities in the wholesale supplying of water from a multiple-purpose project, the Boulder Canyon Project on the Colorado river. By constructing aqueducts and water purification works, regional water needs can be most economically coordinated with river basin projects to ensure the dedication of

water supplies to the uses by man which should have the highest priority.

Hydro-electric Power. Under this heading the commission assembles the most comprehensive data with respect to the public and private development of hydro-electric power anywhere available. It supplies the most authoritative information as to water power, developed and undeveloped, for the United States and for major drainage basins, including a tabulation and charting of all federal hydro power projects—operating, under construction, and authorized—of the Bureau of Reclamation, Army Engineers and TVA.

In a brief but adequate sketch of the development of Federal Power Policy, a background is provided for the discussion of present day policies. Although the construction of Hoover Dam on the Colorado is hailed as the "first comprehensive development of the power resources of a major river basin as a part of a multiple-purpose program," the program of the Tennessee Valley Authority is obviously the ideal model which the commission prefers and which is its basic criterion of judgment. The new elements of policy were, (1) the unified development and regulation of the Tennessee River system, and (2) certain principles for the marketing of hydroelectric power which would "bring lower rates, larger use of electricity by homes and farms, and use of the widespread availability of low cost power for regional development." Whether the future will bring more valley authorities or an improvement in the interagency-river-basin-committee technique (Missouri Valley), in either event the central idea should be unified planning for the comprehensive development of an entire river basin for all purposes including the maximum development of electric power consistent with objectives of flood control and navigation, irrigation or other major public purposes. After 1933, the above power-marketing principles were applied successively to other federal riverbasin projects with the usual preference to public agencies (dating from 1920) and to cooperatives. The only variant introduced in some cases was that rates and allocations of joint cost were made subject to the determination or approval of the Federal Power Commission.

The commission points out that adoption of these power policies came in response to the oft-repeated charge that commission regula-

tion of public utilities had "broken down." The real import of the new measures had come to be known as the "yardstick" policy of regulation by rate comparison. They quote with approval an editorial of the *Electrical World* of June 26, 1943, in which it is suggested "that the electrical industry must substitute the concept of competition for the outlook of monopoly if the opportunity of private enterprise in the business is to be preserved." The changes in management outlook which this yardstick policy was designed to foster is the abandonment of the "short-sighted sales policy which is responsible for high electric rates."

The commission contends that it found "a considerable body of evidence" that this marketing policy had already had a decided effect on the level of electric rates in regions where it had been applied. Rates paid to private companies by REA cooperatives in yardstick states were substantially less, by as much as one-half, than similar rates in states without yardstick competition. Nor was this result obtained at the expense of a reasonable earning capacity. Computations of the rates of return for the years from 1937 to 1949 for certain electric utilities operating in areas adjoining TVA service area as compared with composite rates of return for U. S. electric utilities as a whole seem to bear out this contention.

In light of the foregoing considerations the commission recommends that full development of undeveloped water resources should be considered a major federal responsibility and be undertaken as an integral part of comprehensive basin programs. Future licenses for new non-federal waterpower developments should be issued only with the joint consent of federal agencies responsible for power in basin programs and should continue to be issued with a preference running to state and municipal applicants. In selling the surplus power, federal agencies should be authorized to build transmission lines instead of being required to sell the power at the switchboard, again with preferences in power sales accorded to public and cooperative bodies. The policy of low rates for residential and rural users should be continued. There should, of course, be regional integration of power supplies and to this end public and private sources of supply should be coordinated. Where the federal government has assumed major responsibility for power.

supply to retailers it should be accorded the status of a public utility with the legal duty to meet customers' energy requirements by constructing new generating capacity either steam or hydro.

Correlation of Public Utility Functions with the Basin Project as a Whole. In correlating the manifold activities and functions associated with resource development basinwise the commission proposes the device of a riverbasin commission set up by congress on a representative basis. Their function is to "coordinate the surveys, construction activities and operations of the federal agencies in the several basins under the guidance of an independent chairman appointed by the President and with the participation of state agencies in the planning process." The end result of their activities would be an investment appraisal statement of estimated benefits and costs, direct and indirect, constructed uniform lines and procedures. Supplemented by a board of review, set up on a national basis, these riverbasin commissions would provide Congress the appraisals necessary to set up a resource investment program by means of annual appropriations looking towards a more or less continuous program.³

Another scheme for coordinating the functions involves the drafting of a code of new legislation, or in amending or consolidating existing legislation, which would set up

a uniform national reimbursement policy. The details of reimbursement policy as recommended follow traditional lines; that is to say, hydroelectric power and municipal water supply should be fully self-liquidating; land reclamation beneficiaries should repay costs without interest burden assessed according to their ability to pay; navigation improvements should be reimbursed by a system of waterway tolls (a new note) designed to recover from beneficiaries a "substantial portion of the costs;" flood control, watershed protection, pollution abatement, and recreation, fish and wildlife functions should be financed by a judicious mixture of taxes, fees and special assessments, federal, state and local.

General Comment

By way of concluding this review a few critical comments are ventured. On account of the comprehensiveness aimed at by the commission there is a considerable amount of improvising and sometimes even of dodging difficult questions. Perhaps, under the circumstances, it could not be otherwise. The writer misses, for instance, a thorough discussion of the mooted question of joint cost allocation. Again, this reviewer cannot accept, except with large reservations, the faith of the commission in the efficacy of its so-called yardstick policy. Of course, public utilities in order to hold business will reduce rates to meet competition. What the commission excoriates in one place, in connection with waterway and railway competition, it advocates as a remedy in the electric power field. Nevertheless, the report represents a challenge and the commission should be congratulated upon a job expeditiously and competently performed.

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Fish Pond Culture for Undeveloped Areas

CONTRARY to popular belief the current world food problem is not so much one of absolute shortages as of diets which are nutritionally inadequate. Millions of people in the Middle East, Africa, Southeast Asia, Latin America and our own U. S. South are retarded in the full use of their physical and mental capabilities because their diet is insufficient in vitamins, minerals and proteins. Specifically, most of these people

do not consume enough animal-derived proteins. Fish farming, the raising of fish in ponds, seems to offer at least one economically feasible technique of increasing the available supply of protein food. As such, it has aroused the growing interest of the agricultural and fishing experts of many nations.

The practice of rearing food fishes in ponds under a controlled or semi-controlled environment, usually with feeding and fertili-

³ Included among a batch of "Hoover Commission" bills, and introduced in the Senate on March 15th, 1951, is a legislative proposal (S 1144) to set up within the executive office a "board of analysis for engineering and architectural projects and drainage area advisory commissions." This board is to investigate under the direction of the President and report with recommendations upon all major public projects involving the conservation of water resources. With the help of regional advisory commissions this board would pass upon the engineering, architectural and economic feasibility of all proposals along these lines.

lization of the pond, is an old one in Europe¹ and has been practiced in China and South-east Asia for hundreds of years. However, it is only recently that efforts have been made to compile and coordinate information on this type of food raising, to see what results can be obtained under more scientific methods, and to encourage its extension to other areas which may be short in protein foods.

One of the major recommendations of the recent U.N. mission of technological assistance to Haiti was that a start be made toward investigating the possibilities of pond fish culture for Haiti.² It was recommended that an expert be hired to initiate a practical program; it was even suggested that such a program might be financed by all the Caribbean countries jointly since fish-farming is probably practicable for the whole area. In Haiti itself the potential market demand for fish (a probable 40 million pounds) was estimated to be far above the potential supply (at the most 6 million pounds) available from wild fisheries. The fishery experts of the U.N. mission therefore laid greater stress on the possibility of fish-pond culture to expand the available supply of protein foods than on any possibility of modernizing the fishing fleet.

Senor J. Alvarez, a Mexican scientist, recently published an article which traces the history and the science of pond culture.³ He is certain that the practice could be introduced most profitably into Mexico and furnish the rural people of Mexico with a worthwhile addition to their food supply.

In a letter recently received from the Food and Agriculture Organization of the U.N. (F.A.O.),⁴ the present writer has been informed that: "the Fisheries Advisor to the Colonial Office of the United Kingdom is so convinced that scientific culture of fish can appreciably add to the food supply of the world that he has recommended setting aside large tracts of land near Penang in Malaya for the building of experimental ponds and

the organization of a research station devoted entirely to investigations and improvements of this practice."

The reasons for this growing interest in pond-fish culture are quite simple. Fish-farming can be conducted on land unsuitable or marginal for other agricultural use. It can be started on inland swamp lands, marsh lands, and eroded lands. A properly managed fish pond will do much in fact to halt the further spread of erosion. The yield of fish per acre of pond is very high. Whereas the yield in natural productive waters seldom exceeds 15 to 100 pounds per annum per acre,⁵ the type of fish culture emphasized by the American experts, for example, yields above 200 pounds per acre in fertilized ponds. Moreover, these are game fish—blue gills and bass. In China, where "coarse fish" (i.e., carp) are raised, the yield has been as high as 5,000 pounds per acre. Furthermore, as can be seen in Table I, the conversion yield (the ratio of forage fed to the fish per pound of edible fish raised) is amazingly high. In countries where the fish are fed, this ratio ranged from 1.87:1 (for Japanese carp fed on silkworm pupae) to 5.5:1 (for Japanese eels fed on silkworm pupae and a variety of fish wastes).⁶ The Chinese achieve a ratio of 3.67:1, i.e., for each 3 2/3 pounds of forage fed, they raise a pound of fish; however, the Chinese forage is cheaper than the Japanese. It includes a large percentage of weeds and manure.⁷ The latter fertilizes the pond, inducing a heavy growth of plankton upon which the fish feed. In general, capital costs being relatively low, and the techniques of pond

¹ Mission to Haiti, U.N., 1949, p. 156. This statement probably refers to yield in waters of the temperate zone. There have been studies which indicate considerable variations of yield according to latitude and of course fertility of natural waters. See D. H. Thompson, "The Fish Production of Inland Streams and Lakes," *A Symposium on Hydrobiology* (University of Wisconsin Press, 1941), pp. 206-217. However, the catch of the Egyptian Delta Lakes (believed to be among the most fertile natural waters in the world) is no more than 50 kilos per acre. On the other hand, the catch may only be a portion of the possible sustained yield. See M. K. el Saby, "The Lake Fisheries of Egypt," United Nations Scientific Conference on the Conservation and Utilization of Resources, Spring 1949.

² S. Y. Lin, "Pond Culture of Warm Water Fishes," U.N. Scientific Conference on the Conservation and Utilization of Resources, April 1949.

³ For a full discussion of feeding methods in Chinese fish-ponds, see, C. F. Hickling, "Fish Farming in the Middle and Far East," *Nature*, (London), 1948, p. 748. The grass carp especially is very fond of foraging directly on grass and weeds thrown into the pond.

⁴ There is considerable literature especially in German on European carp culture. A high level discussion of European experience may be found in J. C. Neess, "Development and Status of Pond Fertilization in Central Europe," *Transactions of the American Fisheries Society*, Vol. 76, (1946), p. 335.

⁵ Mission to Haiti, U.N. 1949, pp. 156 ff. Fisheries section by E. F. Thompson.

⁶ J. Alvarez, "El Cultivo De Peces En Estanques Artificiales," *Revista De La Sociedad Mexicana De Historia Natural*, December 1946.

⁷ Letter to author from J. L. Kask, Chief Biologist, Fisheries Division, F.A.O., February 1, 1950.

TABLE I—YIELDS AND FOOD REQUIREMENT OF PONDS IN DIFFERENT COUNTRIES*

Country	Type of fish in pond	Food required (Kg) per hectare	Yield per hectare per annum (Kg)	Food yield ratio
Japan.....	Common carp	7500-9375 (dried silkworm pupae)	3600-5400	1.87:1
China: Yangtze River Regions..	Grass carp, big head, silver carp, black carp, common carp and bream	5600-15,000 (silkworm pupae, silkworm waste, grass, snails, night soil)	2800	3.67:1
China: Kwangtung.....	Grass carp, big head, silver carp, black carp, mud carp and common carp	6000-30,000 (silkworm pupae, and silkworm waste, grass, soybean cake, goat weed (<i>Ageratum conyzoides</i>), pig manure, night soil)	2800-6000	4.09:1
Hong Kong: New Territories	Grass carp, big head, silver carp, mud carp, common carp and grey mullet	5000-20,000 (peanut cake, rice, bran, grass, goat weed, soybean dregs, pig manure, night soil)	2200-3800	4.17:1
Philippines.....	Milk fish		400-980	
Malaya.....	Grass carp, big head, silver carp and common carp	Foods and feeding similar to Chinese method	3400-5600	
India: Bengal....	Catla, rohita and mrigala	No feeding	300-900	
Bengal.....	Same fishes	With feeding	1100-2400	
Palestine.....	Common carp	With feeding	1360	
Japan.....	Eel (95%), common carp (5%)	82,500 (fresh sardine, mackerel scad, dried silkworm pupae)	15,000	5.5:1
Japan.....	Trout	253,120 (livers of horse and pig and mixed meals of sardine and silkworm pupae)	56,250	4.5:1

* Source: S. Y. Lin, "Pond Culture of Warm Water Fishes," U. N. Scientific Conference on the Conservation and Utilization of Resources, April 1949.

culture being relatively simple, fish farming is perhaps the cheapest method of all of providing a given quantity of protein food.

The new nation of Israel in the Near East is the possessor of a large and rapidly expanding fish-pond industry. The success of the industry since it started in 1937 has caused other nations in the area to seriously plan introduction of fish ponds. The Israeli Vice-Consul in New York sums up his country's experience with this industry, thus:

"Fish breeding in ponds began in 1937 and developed to our main branch of fishing. The production in 1940-1941 was 38,772 kg., and in 1947-1948 it was 2,253,708 kg., out of a total fish catch of 2½ million kg. Over thirty collective settlements have set up ponds, mainly in the swampy soil in the Huleh area and the Jordan Valley, but also in some other parts of the country. Thirty-five hundred acres were recently under pond culture, and plans for their extension are actively considered. The main fish is carp, but trout eggs have been imported recently for experimental purposes, and also gray mullet and other salt water fish have experimentally been bred in fresh water ponds. The Israeli Fish Breeders Association have submitted plans for further extension to the Ministry of Agriculture."

Fish farming in Israel, as mentioned above, is of recent origin.⁸ In 1937, a few Yugoslavian immigrants brought some carp with them. The growth of these in the mild climate of Palestine was amazing; the yield was two or three times as great as the 300 or 400 pounds per acre with which European pond fish farmers were contented. The social and economic climate in Palestine was as favorable as the physical one for the extension of fish farming. To many of the colonists all agricultural techniques were unfamiliar to begin with and therefore fish-farming on a large scale hardly seemed a startling innovation. These people had not yet developed the distrust with which so many farmers over the world greet "silly experiments." Furthermore, carp (the fish best adapted to fresh water cultivation) found a ready market in Palestine. Carp is a valued item of diet in most of continental Europe; the Jewish people especially enjoy it because it is the main ingredient of a traditional Friday night dish. In fact the demand conditions were just right in that

the Jews, a fish-loving people, had come into a land whose resources of wild fish were relatively low and because the war seriously cut the supply of alternative imported protein foods.

In a paper presented at the U.N. Scientific Conference on the Conservation and Utilization of Resources, Dr. M. Shelubsky of Israel, outlined quite precisely the factors which had made fish farming so readily adaptable to the Israeli economy.⁹ Many of these favorable factors may exist in other countries. He writes:

"Food supply, especially proteins, has become a world problem during the last few years. Food shortage became acute following the Second World War, and means were sought to overcome this shortage by new and better ways of food production. Under these circumstances, fish-farming in natural and artificial ponds assumed growing importance in national and world supply planning.

"Israel, at that time Palestine, had always been almost entirely dependent on foreign markets for its protein supply, and in time of war, when normal communications and commerce with the outside world are disturbed, the danger of hunger becomes imminent.

"Attempts were made to breed cattle, poultry, to exploit natural fisheries and to breed fish in artificial ponds. The last solution has assumed ever-growing importance in the last few years.

"Fish-farming was developed in Israel as one branch of the mixed farming method. Its place in the general structure of agricultural economy and the mutual influences between fish-farming and other branches of agriculture are worthy of a special note.

"1. In many places in Israel fish-farming has enlarged the agricultural potential of the land by utilizing areas unfit for anything else. In many places it constituted the main and only basis for settling in the area.

"2. The relatively short time needed for a profitable establishment of this branch enabled new settlements to overcome difficulties inherent in other branches.

"3. As fish can be fed successfully with certain legumes such as *Lupinus*, this enlarges the agricultural potentialities of many places. It also combines most favourably with the need for crop rotation.

"4. It is contemplated to use part of the fish pond areas in turn for fish-farming and other agricultural uses. Thus the intensive fertilization of the pond area makes itself felt in the yield and at the same time improves the land for fish-farming in the following years.

"5. Fish-farming plays an important part in the

⁸ For a discussion of pond culture in Israel, see S. C. L. Bertram, "Carp Farming in Palestine," *Empire Journal of Experimental Agriculture*, 1946, p. 187.

⁹ M. Shelubsky, "A Review of Fish Farming in Israel," U.N. Scientific Conference on the Conservation and Utilization of Resources, August 1949.

utilization of waste products of the oil industry from cotton seed, which are plentiful in the Middle East.

"6. Fish ponds may be used as reservoirs of water in certain areas, in which there is insufficient water supply, by collecting water during the winter and correlating their emptying with the needs of irrigation.

"7. Reservoirs, which are to be erected according to general irrigation development plans (such as the Lowdermilk plan) may be partly used for fish-breeding. This may contribute to the economic benefits of such plans."

As fragmentary as they are, some of the economic statistics on Israeli fish-farming may be of interest.¹⁰ It can be roughly estimated that the fish farms produced about six pounds of fish for each inhabitant of Israel in 1948-1949. For each pound of fish she purchases the Israeli housewife pays the current controlled retail price of approximately 67 cents. (It must be remembered that this price reflects a certain amount of inflation.) The controlled wholesale price is currently around 53 cents per pound; after deducting transportation costs and a 4 per cent commission to the marketing cooperatives, the return to the fish raising colonies is about 48 cents per pound. The official agencies believe that this last figure, "is sufficient to cover all production costs."

The estimated capital cost of developing an acre of fish pond is about \$672. Since the average annual physical return of an acre of pond is about 1,373 pounds or in money terms some \$659.00, it is obvious that the major costs of fish culture are not capital costs, but variable costs—an important consideration to countries such as Israel where capital is for the moment relatively scarce.

The fish pond industries in China and India are perhaps the oldest in the world and the most intensely developed. It is of interest that the F.A.O. has hired a Chinese expert, Dr. S. Y. Lin, to do full-time work in promoting the fish pond industry. The high yield of the Chinese fish ponds is due to a well-developed technique in which the feeding habits of various varieties of carp are so utilized that the food potential of the pond is exploited to the fullest. That is, varieties are stocked so that the surface feeders, bottom feeders and scavengers are in proper ratio to each other. This ratio has been

determined by experience but it is hoped that, perhaps through research, proper ratios might be determined for other countries in the world. There has also arisen in China a group of skilled fry sorters, people who can separate the various varieties of baby carp and mix them in the proper percentage to be stocked in the ponds. The basis of this technique lies in the fact that the various varieties of baby fish differ in their oxygen needs. If the fish are kept for a time in a jug, the fry move to the surface as the water begins to lose oxygen content. If a small amount of fresh water is then poured into the jug, those varieties that can subsist on less oxygen, drop to the bottom while that variety whose oxygen needs are still not satisfied remains at the top. It is then skimmed off and put into another jug. Through successive small dosages of oxygen-containing water, all the varieties can be skimmed off one by one, according to its desire or need for oxygen.¹¹

Unfortunately, many of the best variety of Chinese carp do not breed in captivity and the fry of the wild species must be captured along the river banks in order to stock the fish ponds. However, since the fry were formerly distributed all over prewar China by railroad and plane, it may be possible that in more normal times the most valuable of the Chinese species of fry might be exported by air to other countries.

In India, too, fish pond culture is an old, established, and rather traditional art. Nevertheless, this country has also produced a band of devoted experts who have done much scientific work toward improving techniques, the introduction of new species, and the possibilities of acclimating salt or brackish water fish to cultivation in fresh water.¹²

S. L. Hora is one of the leaders in this research and his papers on the subject have a world-wide reception. The Indians as a group seem more concerned than the experts of other nations in the public health problem; the problem of designing and stocking ponds so that the breeding of mosquitoes is kept at a minimum.¹³

¹⁰ C. F. Hickling, *op. cit.*

¹¹ P. I. Chacko, and T. J. Job, "Rearing of Saltwater Fish in Fresh Waters of Madras," *Indian Ecologist*, December 1947.

¹² S. L. Hora, "Management and Cultivation of Fresh Water Fish," U.N. Scientific Conference on the Conservation and Utilization of Resources, March 1949.

¹³ Adapted from statistics supplied by Dr. K. Reich, Israeli Ministry of Agriculture, Department of Fisheries.

In Southeast Asia fish farming is somewhat newer than it is on the Asiatic mainland. In Indonesia and the Philippines the emphasis is somewhat stronger on the raising of tidal water fish, mullet or bangos. Although the carp is extensively raised, the favorite fresh water fish is the goramy. Of these, the most popular pond fish in the Philippines is the bango. The bango is not fed under cultivation, but the tidal water ponds are especially prepared before the introduction of the fry to furnish a favorable environment. This is achieved by holding the water depth of the raising pond to a few inches causing a heavy growth of lab-lab (algae) upon which the bangos feed. The ponds are then flooded to a depth of three or four feet before being stocked with the fry which must be gathered wild since neither the bango nor mullet breed in captivity.¹⁴ Some experimentation is under way which points to the possibility of fertilizing the pond, to induce an increased growth of lab-lab, and thus bring about a heavier yield of fish.¹⁵

The raising of bangos (milk fish), mullet, and goramy has been strongly encouraged by the Philippine government. The Bureau of Fisheries of the Philippines stands ready to give technical advice and demonstrate the more improved methods of fish pond culture and construction to all those venturing into the field. The Philippine government rents out large areas of salt and fresh water swamps at a nominal charge to encourage people to develop these areas into productive fish ponds.¹⁶

The Philippine Bureau of Agriculture believes that a properly constructed pond for the raising of goramy will yield close to 39% on the invested capital—after all expenses including labor are taken out.¹⁷ This figure is undoubtedly somewhat exaggerated, but indicative of the profitability of fish farming is the growth in productive pond

acreage. In 1939, there were about 61,000 hectares¹⁸ of regularly constructed fish ponds of all types. The latest figure shows some 70,000 hectares in production; and most all of the increase has come since the liberation; as a matter of fact, some acreage went out of production during the Japanese occupation.

Nevertheless, the latest survey shows undeveloped swamp land of some 168,657 ha. fresh water, and 430,405 ha. of salt water mangrove swamps, a total of 599,062 ha. of potential fish pond acreage. If this acreage were suitably developed and yielded comparatively to the present ponds, a total of 200 million kilograms of fish could be added to the Philippine food supply. This would be a significant increase since the present Filipino consumption of fish from all sources (including imports) is 595,000,000 kg.¹⁹

Significantly enough, the experts of the United States do not emphasize commercial possibilities of fish farming as much as they do recreational opportunities and the possibility of adding variety to the farm family diet.²⁰ Through the use of balanced stocking and of inexpensive applications of commercial chemical fertilizers rather high sustained yields of 200 pounds or more of bass and blue gills may be obtained. The great advantage of farm fish ponds is the use that can be made of marginal land and of land that is subject to erosion. As a matter of fact, it is possible that the owner of a successful fish pond will be induced to put in soil conservation measures that otherwise he would not take, since erosion of the pond drainage area will ruin the pond. The Department of Agriculture's Farmers' Bulletin No. 1983²¹ is an attractively written piece of literature outlining the enjoyment and use of a fish pond, its proper management, and the appropriate steps to be taken as a safeguard against erosion. The major part of the discussion is based on the pioneering work in pond management performed by H. S. Swingle and E. V. Smith of the Agricultural Experiment Station of the Alabama Polytechnic Institute.²²

¹⁸ A hectare equals about 2.47 acres.

¹⁹ H. R. Rabanal, *op. cit.*

²⁰ O. L. Meehan, "Pond Culture of Warm-Water Fishes as Related to Soil Conservation," U.N. Scientific Conference on the Conservation and Utilization of Resources, May 1949.

²¹ V. E. Davison, *Farm Fishponds for Food and Good Land Use*, United States Department of Agriculture, Bulletin No. 1983.

²² E. V. Smith and H. S. Swingle, *Management of Farm Fish Ponds*, Agricultural Experiment Station of the Alabama Polytechnic Institute, 1947, Bulletin No. 254.

¹⁴ For a good discussion of the technique of Philippine fish pond culture, see D. G. Frey, "The Pond Fisheries of the Philippines," *Journal of Marine Research*, 1947, pp. 247-258 and H. R. Rabanal, "Pond Culture of Warm Water Fishes," U.N. Scientific Conference on the Conservation and Utilization of Resources, May 1949.

¹⁵ D. V. Villadolid, and D. K. Villaluz, *A Preliminary Study on Bangos Cultivation and its Relation to Algae Culture in the Philippines*, Philippine Department of Agriculture, Manila, 1949, Bulletin No. 30.

¹⁶ Philippine Department of Agriculture, Bureau of Fisheries, *The Raising of Bangos*, Leaflet No. 6.

¹⁷ Philippine Department of Agriculture, Bureau of Fisheries, *The Raising of Goramy*, Leaflet No. 5.

Even a rather brief survey, such as is contained in this paper, of the results of aquaculture in various parts of the world leads to the conclusion that this is a highly flexible technique, capable of being adapted to many places and of producing good results in many different circumstances. It is physically practicable and has economic and social advantages which make it worthy of consideration not only by biological scientists but by economists who are interested in economic development programs such as Point Four.

It is a commonly accepted dictum that the Point Four Program of technical assistance to undeveloped areas should, in a great many countries, start from an extremely basic level. That is, not by introducing large amounts of new capital or "astounding" new industries, but by improving the methods of production in already existing industries, and by introducing new forms of production which are simple in nature and which can be readily adapted into the economy as it al-

ready exists. It would seem that fish farming meets the requirements of a technical assistance program on all counts. Under scientific direction, yields could be increased both qualitatively and quantitatively, and the area of cultivation be considerably expanded in those countries where fish culture already exists. In countries where the practice is unknown it can be introduced on its simplest level, perhaps with the adoption of native fish as the basic breeding stock.

In short, fish pond culture is eminently suitable for introduction into undeveloped areas because the fundamental technique is relatively uncomplicated, because capital requirements are low, because the ensuing product finds a ready market, and, perhaps most importantly, because the industry can be instituted on land that may be submarginal for other agricultural use.

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The Farming Cooperative: A Reply

THE author of the article, "The Farming Cooperative: A New System of Farm Management,"¹ presents the farming cooperative organization of agriculture under the German occupation in the southern part of Russia (Ukraine) as a successful experiment in a new agrarian order. He sees this system as a possible solution for the profitable use of farm machinery and crop rotation corresponding to the postulates of modern agriculture and the principle of private ownership and enterprise in a society where small parcels of land, if any, belong to individual farmers.

He seems to assert that the farming "co-operatives" of the Nazi-occupied Ukraine appeared to be a progressive way of organizing agriculture, adjusted to local conditions.

It seems to me that, to make the question quite clear, we must completely separate (1) the question of the land tenure system, and (2) the question of the effective use of the equipment (machinery) for agriculture.

Starting with the fact that agricultural machinery was scarce, as Dr. Schiller points

out, it appears quite reasonable that a cooperative plan of using the equipment, during both cultivation and harvest-time, might work out satisfactorily. But the question of land tenure itself involves different considerations. It is necessary, first, to give a true picture of existing conditions; and I cannot agree with the author's statement that farming cooperatives "aimed at a transition to individual farm operation . . ."² The highest Nazi authorities did not make a great mystery about their program. They planned to clear this part of the occupied eastern countries of the local population entirely and to replace them with German colonists. Not too clearly the blueprint of this idea can be found in Hitler's *Mein Kampf* (*My Struggle*)³ but quite clearly in several articles in *Ostland*.⁴ The local rural population, according to this program, was to be used in the most efficient way possible during the war for food production but was to remain on the land only so long as the German manpower was absorbed by war.

¹ *Ibid.*, p. 3.

² "Wir und Russland," *Mein Kampf*, p. 735 (in German).

³ See Otto Schiller, "The Farming Cooperative: A New System of Farm Management," *Land Economics*, February 1951, p. 1-15.

⁴ Monthly publication of the Planning Board for Eastern Occupied Countries. Posen, 1941-43 (in German).

It does not seem possible that this important basic purpose of the Nazi authorities, concerning which definite instructions were given in the government's orders, could help but be well-known to the author, a High Councilor of the German Military Government (Militarverwaltungs Oberrat) in the occupied Ukraine during the war. Once this is taken into account, the "cooperative plan" assumes a different aspect.

The abolition of the kolkhoz system was indeed one of Hitler's most impressive slogans when starting the war against the Soviet Union. But when it came to the practical fulfillment of these promises instead of the private ownership eagerly expected and awaited by the local Russian and Ukrainian population there was organized the "cooperative farms" described by Dr. Schiller: little more than the kolkhoz under a new name and with new masters.

The "cooperative farms" were a most convenient instrument by which the German occupation authorities could control the entire food production of the occupied country and pump needed food supplies from the population. Their aim in the "cooperative farms" and the kolkhozy aims were exactly the same: one was a Nazi plan, the other a Communist plan. In their purpose and most of their procedures they differed very little. From the viewpoint of the Russian farmer, instead of a Communist or Communist-influenced management (kolkhoz) there appeared a German manager and the more effective he was from the viewpoint of the German military authorities, the worse for Russian farmers.

The efficiency of work of such managers (stressed by Dr. Schiller) was one of the reasons why the local population, which in the beginning of the war awaited the Germans as liberators because of their hatred of the kolkhoz system, joined the partisan (resistance) movement organized by the Soviet military command.

So much for the ideological and economic aspects of the farming cooperatives in occupied Russia. Evidence of the accuracy and truth of my comments may be found in the petition of the Russian farmers asking for the abolition of the kolkhoz system—as they called this "cooperative" plan—which petition was prepared in a meeting of farmers in Minsk in 1942. They did not see any real difference between the kolkhoz and the

"farming cooperative." What Dr. Schiller said is equally eloquent: "The manager determined how many heaps (60 sheaves each) each farmer had to deliver to the threshing machine or to a common stacking place according to the quality of the grain and the weight of the single sheave. The threshing of this part of the harvest proceeded jointly by the respective groups. The rest of the grain in the straw was equally divided among the members of the individual groups and carted from the fields to the individual farmsteads and eventually threshed by the farmers themselves at the most convenient time."⁵

"Naturally a procedure like this called for an efficient manager of the farming cooperative and one endowed with sufficient authority and experience in appraising heaps of grain."⁶ This statement hardly agrees with another statement of the author in the same article: "Now in contrast to kolkhoz practice the farmers had possession of the grain prior to delivery."⁷ And again: "Particularly in the beginning members of the farming cooperatives frequently did not understand the advantages of joint cultivation." "It took time to make the farmers understand that the principle of the farming cooperative was different from collectivism."⁸

I must confess that I cannot understand what difference there was between these two systems because in both cases state delivery was prior to any private participation or ownership in the crop.

Dr. Schiller stated: "Meadows and permanent pastures were always left as individual common property. Common pastures are an old tradition in Eastern Europe."⁹ This "old tradition" was a consequence of the serfdom period prior to 1861 and was seen as a great evil by all who had a share in agrarian problems in this part of Europe.¹⁰

Revival of such "old traditions" gives little credit to the "new system of agrarian relations" which Dr. Schiller would praise and which in fact was used only because the German occupation authorities during the war (1942-44) had to do what could be done quickly. They did not have time to work out real solutions for some of these problems.

⁵ Schiller, *op. cit.*, February 1951, p. 14.

⁶ *Ibid.*, p. 14.

⁷ *Ibid.*, p. 10.

⁸ *Ibid.*

⁹ *Ibid.*, p. 9.

¹⁰ Dimitri Pronin, "Land Reform in Poland," *Land Economics*, May 1949, p. 137.

Dr. Schiller, in speaking about the division of land, said: "The disadvantages would be partly equalized through the proportionate reduction or increase of acreage. This of course would require comprehensive preliminary work as far as soil appraisals and surveys are concerned."¹¹ In this connection it may be pointed out that, from the beginning of land reform programs in Russia (1906) until the last steps taken in Poland in 1939 and in other east European countries, all consolidation of scattered parcels was done only according to *value*, not according to acreage. The fact that the German occupation authorities were short of time for preliminary survey work and estimat-

¹¹ Schiller, *op. cit.*, p. 5.

ing soil values, can hardly be seen as an achievement and an advantage of the farm cooperative system.

The dividing of land into (a) major fields, (b) *gewanne*, (c) individual parcels of common use and (d) individual parcels seems to me to be very artificial and complicated. Only one explanation is left—the completely abnormal circumstances of a war period. Therefore their methods cannot be considered a model for regulating land tenure relations on quite a new base, and with significance for other countries.

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The Farming Cooperative: Rejoinder

THE title of my article reveals that it was not intended to elaborate on the land tenure system in Russian agriculture. It merely referred to a new system of farm management which, even before World War II, had received much thought in Germany as well as in other countries and had led to some practical tryouts. The same issue has been discussed frequently in various countries since the war. Since the first large-scale experiment to this end was undertaken in the German-occupied territories of Russia during the war, I have set forth the experiences of the Russian peasants there as examples in my article. In doing so, there was no intention on my part to relate these experiences to any political aims.

The fact that the establishment of farming cooperatives constituted only one part of the so-called "New Land Tenure Program" for the occupied Soviet territories is further proof that the article neither dealt with a political question nor with the question of the land tenure system. Individual management was another very essential part of the agrarian program which, however, was not dealt with in my article since it was a matter beyond my particular topic. It appears that Mr. Pronin is not aware of the fact that in the large areas between Minsk and Orel—the so-called middle section of the occupied Soviet territories north of the Ukraine—all *kolkhozi* had been abolished in 1942 and individual management reinstated. They

had even gone so far as to reestablish separate holdings according to the Stolypin Program.¹ Thus it follows that the petition of the Russian farmers at the Minsk meeting, mentioned by Mr. Pronin, was rendered unnecessary by the events of half a year later. Moreover, in addition to forming farming cooperatives, systematic steps had also been taken in the Ukraine toward the establishment of genuine individual farms.²

Further details in this respect are to be found in my booklet entitled *Objectives and Results of the Land Tenure System in the Occupied Eastern Territories*,³ which was published in 1943 for official use only. A copy of this booklet is in possession of the University of Wisconsin and therefore should certainly be known to Mr. Pronin. It served to inform and train thousands of Germans and Ukrainians who participated at that time in the implementation of the agrarian program. The booklet can therefore be considered as an unobjectionable reference. With regard to the farming cooperatives, the material contained in this booklet corresponds to that contained in my article.

In my article the working procedures of the farming cooperatives were described in detail. He who knows the working pro-

¹ O. Schiller, *Ziele und Ergebnisse der Agrarordnung in den besetzten Ostgebieten*, Reichsnachstandsverlag, Berlin, 1943. For official use only. P. 24.

² *Ibid.*, p. 38.

³ *Op. cit.*

cedures of kolkhozi must realize the fundamental difference. Mr. Pronin seems not to see this difference. This is perhaps to be explained by a misunderstanding: As stated, approximately 2,000 former kolkhozi of the Ukraine were converted into farming co-operatives.⁴ This is, however, only 10% of the total number which means that the greater part of the kolkhozi were merely given a new name while they generally adhered to their old working methods. As far as these enterprises are concerned, Mr. Pronin is right in his statement.

The abolition of the kolkhoz system was not used as a political slogan at the beginning of the war with Russia, but was promulgated in connection with the new land tenure system as late as February 1942. It is interesting to note that in the summer of 1941, at the time the abolition of kolkhozi was still prohibited by the German authorities in hundreds of remote villages not reached by the German orders, the kolkhozi were dissolved by the farmers themselves. I studied these cases of voluntary action very carefully at that time and derived from them the idea for the development of farming co-operatives. The peasants generally had not divided the kolkhozi among themselves so that each individual had a separate and consolidated tract of land, but had divided each former field of kolkhoz enterprise into parcels, with each peasant having parcels in several fields, thus adhering jointly to the old crop rotation in the subsequent process of individual farming.⁵ Thus the main feature of the farming cooperative was created by the peasants themselves. This form of dividing the fields was very much simpler and fairer to carry out than would have been the case if the peasants had attempted to divide the land into consolidated tracts without expert assistance.⁶ These peasants obviously did not share Mr. Pronin's opinion that this kind of land distribution was "very artificial and complicated."

This might also serve as an explanation why prior soil appraisals could be dispensed with and which Mr. Pronin found to be a specific deficiency. I have pointed out in my article that prior soil appraisal would have been necessary only if the land was to have

been divided into consolidated tracts. Since, however, the land division was carried out on the basis of the so-called "strip-system," any "differences were normally counterbalanced according to the rules of probability, because of the individual strips being divided among six or eight different fields".⁷ Furthermore, I have stated in my article that, for most part, the peasants themselves had undergone the experiences described in the article and "with their own resourcefulness and practical minds, contributed substantially to the further development of cooperative operational methods".⁸ Mr. Pronin errs when he believes that the managers of the farming co-operatives were German functionaries. In every case the manager of a farming co-operative was an intelligent Ukrainian. If I had described the experiments that the Ukrainian peasants had undertaken in 1941 contrary to German orders, it would surely have led Mr. Pronin to other conclusions than those he drew from the same experiments of these peasants in 1942 and 1943, undertaken on the basis of German orders.

Mr. Pronin considers the farming co-operatives as nothing but "a most convenient instrument by which the German occupation authorities could control the entire food production." He certainly must admit, however, that a far more convenient instrument for control of the entire food production would have been the kolkhoz system in its original form. It is obvious that there must have been other reasons and objectives for complete abolition of the kolkhoz system outside the Ukraine and abolition step by step in the Ukraine itself.

It is unjustified to identify the farming co-operatives with kolkhoz enterprises just because both had to deliver their surplus products. During the war German farmers also had to deliver their entire product, but no one thought of comparing German wartime agriculture to the kolkhoz system. The obligation to make total delivery of surplus production would have eliminated the personal interest in individual harvesting; that is true. The introduction of fixed delivery quotas was, therefore, a necessary prerequisite for the satisfactory functioning of farming co-operatives. The methods applied have been described in detail. The simplified

⁴ O. Schiller, "The Farming Cooperative: A New System of Farm Management," *Land Economics*, February 1951, p. 2.

⁵ O. Schiller, *Ziele und Ergebnisse der Agrarordnung in den besetzten Ostgebieten*, Reichsnaehrstandsverlag, Berlin, 1943.

⁶ *Ibid.*, p. 38.

⁷ O. Schiller, "The Farming Cooperative: A New System of Farm Management," *Land Economics*, February 1951, p. 7.

⁸ *Ibid.*, p. 15.

procedure, however, in which Mr. Pronin seems to be most interested was not the rule, but was applied only "in some cases."⁹ Here Mr. Pronin errs again when he thinks that German functionaries rather than Ukrainian peasants acted as managers. As described in my article "individual threshing was an indispensable element in realizing the goal of private enterprise in farming cooperatives."¹⁰ The necessary consequence was that "the farmers had possession of the grain prior to delivery."

The fact that meadows and permanent pastures remained joint property for common use is cited by Mr. Pronin as a relapse to serfdom practices as they existed prior to 1861. But actually this arrangement existed throughout Russia until collectivization by the Soviets, and its continuation was self-evident after the introduction of the kolkhoz system. The continuance of commonly-used meadows and pastures also met with the wishes of the peasants.

It was my intention to render a scientific contribution to a problem of agricultural economics. Mr. Pronin, however, approaches

the issue from the political angle. In doing so, he refers to irrational ideas which allegedly were developed by some dreamers for realization in postwar times, and gives proof, by quoting as his source, a paper (*Ostland*) which is unknown to me and has so far received no attention from any other side. The question of the Nazi government's political objectives in the war with Russia is an historical question and can be clarified only by serious, historical research, such as presently undertaken by Harvard University or, with respect to food and agriculture, by Stanford University. A question like this can never be solved by arbitrary reference to a source which is neither authoritative nor sufficiently identified. Furthermore, the subject under discussion is completely apart from the solution of this question. It will suffice for the agricultural economist to study the experiences of the peasants of another country under a new form of farm management, and thereby determine whether these experiences offer a lesson for the theoretical development of the system or its practical implementation.

OTTO SCHILLER

Hohenheim, Germany

Federal Labor Legislation to Govern Public Utility Strikes

IN 1935 Congress pre-empted the field of labor relations by enacting The Labor Relations Act, colloquially known as the Wagner Act. Federal labor legislation was modified in certain respects by the passage in 1947 of the Labor Management Relations or (Taft-Hartley) Act. As so modified, the federal law represents a comprehensive and pervasive scheme governing labor disputes and union activities. A constant debate, incapable of dogmatic resolution, has centered upon the question of how far and in what way state regulation of labor relations can be properly permitted in light of the federal law. In ending another round of this debate, the Supreme Court of the United States in a 6 to 3 decision overthrew the state public utility anti-strike law of Wisconsin in *Motor Coach Employees v. Wisconsin Employment Relations Board*.¹

The federal labor law² governs labor relations in businesses and industries either in, or affecting, trade, commerce, transportation, or communications among the several states. It also provides that employees:

"... shall have the right to self-organization, to form, join, or assist labor organizations, to bargain collectively through representatives of their own choosing, and to engage in other concerted activities for the purpose of collective bargaining or other mutual aid or protection, and shall also have the right to refrain from any or all of such activities except to the extent that such right may be affected by an agreement requiring membership in a labor organization as a condition of employment as authorized herein."³

In connection with this union shop provision of the Taft-Hartley Act, the National Labor Relations Board had, prior to the *Motor Coach Employees* case, certified both the

⁹ *Ibid.*, p. 14.

¹⁰ *Ibid.*, p. 13.

¹ 340 U. S. 874, February 26, 1951.

² 29 USCA sections 151 et seq.

³ *Id.*, section 157.

Amalgamated Association of Street, Electric Railway and Motor Coach Employees of America for the operating employees of the Milwaukee Transport Company, and the United Gas, Coke and Chemical Workers of America (CIO) for the workers of the gas company in Milwaukee as the authorized collective bargaining representatives, respectively, for their members.

Another section of the federal act provides: "Nothing in this subchapter, except as specifically provided for herein shall be construed so as either to interfere with or impede or diminish in any way the right to strike, or to affect the limitations or qualifications on that right."⁴

The federal labor law establishes a process for conciliation of labor disputes in "national emergencies." In subchapter III⁵ of the Act the policy of the United States is stated to be that:

"... sound and stable industrial peace and the advancement of the general welfare, health, safety of the Nation and of the best interests of employers and employees can most satisfactorily be secured by the settlement of issues between employers and employees through the processes of conferences and collective bargaining between employers and the representatives of their employees."

The law also makes it a policy that government facilities for conciliation and voluntary arbitration should be used to avoid strikes that lead to national emergencies. The governmental agency for such purposes is the Federal Mediation and Conciliation Service. Where strikes still threaten to occur and a national emergency situation is involved, the President has the duty to establish a board of inquiry. The board determines the issues involved and reports its findings and recommendations, if any, to the President.

Thereupon the President has the authority to direct the attorney general to petition a district U. S. court for an injunction which can be granted where the strike or lockout "affects an entire industry or a substantial part thereof, engaged in trade, commerce, transportation, transmission, or communication among the several states . . . or engaged in the production of goods for commerce," and, if "permitted to occur or to continue, will imperil the national health or safety . . ."

After such a court order the disputants are under a duty to make every effort to adjust

and settle their differences with the help of the governmental facilities for conciliation, but are not required to accept any government proposal. After 60 days the board of inquiry again reports to the President, giving him, among other things, the contents of the employer's last offer. Then, within 15 days thereafter, the National Labor Relations Board holds an election of the employees to determine their attitude on the employer's final offer of settlement. After certification of the election results the attorney general moves the court to dissolve the injunction, presumably even in a case where the strike which will cause a national emergency is still imminent.

In view of the nature of the court's reasoning in the *Motor Coach Employee's* case it is essential that the Wisconsin law, which was found by the court to be repugnant to the labor law passed by Congress, be at least summarily reviewed, and that some attempt be made to align its provisions with the federal law.

The law under review, and invalidated by merit of this court decision, was the Public Utility Anti-Strike Law of Wisconsin which was embodied in subchapter III of Chapter III of the Wisconsin Statutes,⁶ the chapter dealing with labor relations generally. In the portion of the law declaring the state's policy and purpose in dealing with public utilities in such a manner, there is included the following:

"The interruption of public utility service results in damage and injury to the public wholly apart from the effect upon the parties immediately concerned and creates an emergency justifying action which adequately protects the general welfare."

Basically, the state law provides that a process of conciliation followed by compulsory arbitration is to be utilized whenever, in a labor dispute between a public utility and its employees, the collective bargaining process reaches an impasse or stalemate, such process to be operative upon the finding by the state labor relations board that the dispute, if not settled, will cause or is likely to cause interruption of an essential service.

An "essential service" is defined to mean "furnishing water, light, heat, gas, electric power, public passenger transportation or communication, or any one or more of them, to the public in this state." A "public utility

⁴ *Id.*, section 163.

⁵ 29 USCA sections 171 et seq.

⁶ Sections 111.50 to 111.65, Wisconsin Statutes.

employer" in the state law was defined as "any employer (other than the state or any political subdivision thereof) engaged in the business of furnishing water, light, heat, gas, electric power, public passenger transportation or communication, or any one or more of them, to the public in this state; and shall be deemed to include a rural electrification cooperative engaged in the business of furnishing any one or more of such services or utilities to its members in this state . . ."

Section 111.62 of the Wisconsin Statutes makes it unlawful for any group of employees of a public utility employer acting in concert to call a strike, go out on a strike, or cause any work stoppage or slow-down which would cause any interruption of an essential service. Likewise it is also unlawful for such an employer to cause a lock-out or for any person to instigate, induce, to conspire with, to encourage any person to strike or cause a lock-out.

The procedure established by the Wisconsin public utility anti-strike law for the settlement of disputes is briefly this: First, the state employment relations board has a list of persons constituting a panel of conciliators. When labor negotiations in a public utility industry have reached an impasse or stalemate either the company or the union can petition the board to appoint a conciliator from the panel. The person so named, if unable to effect a settlement within 15 days, reports that fact to the board. Secondly, at this stage, where the board still believes that the dispute will effect an essential service, it gives to the parties a list of 3 or 5 persons from the standing panel (not to include the person who acted as conciliator, however,) and, by means of having the parties alternately striking off a name, a person to act as arbitrator is determined. The arbitrator then hears and determines the dispute.

The arbitrator's set of duties and a standard for performing them are spelled out in the statutes. Where he has the task of interpreting an existing contract the legislation requires him to make written findings after listening to all the evidence of the parties, and to concern himself only with the terms of the contract. Where there is no contract, or where parties are looking for a change in an existing contract, the arbitrator must give weight to certain specified factors, among others. He is to compare the wages and

working conditions of the public utility employees with such elements within the utility's operating area, and he is to make a similar comparison with workers doing similar jobs in the area. He is to consider the value of the service to the consumer in the area and to regard, in all his comparisons, as separate entities the various operating areas of a utility corporation. The arbitrator is not precluded from other traditional and normal labor arbitration considerations, however.

Section 111.58 of the Wisconsin Statutes provides:

"The arbitrator shall not make any award which would infringe upon the right of the employer to manage his business or which would interfere with the internal affairs of the union."

The finding and order of the arbitrator is to be binding and controlling upon the relationship of the parties, but his decision is subject to judicial review. It is the responsibility of the state employment relations board to enforce all orders lawfully issued under the law, and to seek injunctive relief in the court whenever necessary for such enforcement, the state policy against the use of labor injunctions being not applicable under the provisions of the public utility anti-strike law.

The law places the following construction upon itself:

"Nothing in this subchapter shall be construed to require any individual employee to render labor or service without his consent, or to make illegal the quitting of his labor or service or the withdrawal from his place of employment unless done in concert or agreement with others. No court shall have power to issue any process to compel an individual employee to render labor or service or to remain at his place of employment without his consent. It is the intent of this subchapter only to forbid employees of a public utility employer to engage in a strike or to engage in a work slow-down or stoppage in concert, and to forbid a public utility employer to lock out his employees, where such acts would cause an interruption of essential service."⁷

The *Motor Coach Employees* case was the ultimate disposition of two distinct and separate pieces of litigation, both matters being decided in the same opinion of the Supreme Court by the holding that the Wisconsin law was invalid. One of these two dockets originally arose when a contract between The Milwaukee Electric Railway and Transport

⁷ Section 111.64, Wisconsin Statutes.

Company and the union for the company's transit workers terminated after being in effect for many years. The two parties were unable to agree upon new terms for wages, hours or working conditions and, in order to enforce its current demands upon the company, the union called a strike. Almost immediately the Wisconsin Employment Relations Board (W.E.R.B.) secured a court order restraining the strike and in compliance with the order the union had the strike postponed. The court subsequently entered an order perpetually enjoining the union or any of its officers from calling a strike which would cause any interruption of the mass transportation system and service of the Transport Company. This order was affirmed on appeal by the Supreme Court of Wisconsin.⁸

In the other historic contest, the issues also emerged after labor contract negotiations broke down. Here involved were the workers of the Milwaukee Gas Light Company, and the Milwaukee Solvay Coke Company, its subsidiary. The gas workers left their jobs when their union called a strike. The W.E.R.B. secured a restraining order from the local state circuit court. Although there appeared in the newspapers some pictures of certain gas worker pickets stomping upon the written copies of the court order after the order had been read to them by a deputy sheriff,⁹ the walk-out was of only 25-hours' duration, the union having accepted a company offer of five cents an hour increase. The court later found, however, that its order to the union and its officials to "take immediate steps to notify all employees called out on strike to resume service forthwith" had not been obeyed. Accordingly, the court entered a judgment of contempt and various persons were fined. This judgment was appealed to the state supreme court where the lower court was affirmed.¹⁰

In both the transit workers and gas workers cases before the state supreme court, the claim that the Public Anti-Strike Act was violative of principles of due process and equal protection was heard. Justice Broadfoot, in writing the opinion in the transit workers case, observed that all the arguments

made expounding the rights of the individual ignored both the countervailing rights of the public as well as the concept that such rights are not always absolute. Public utility employees, like public utility investors, must expect some regulatory action by the state, and persons seeking employment in a public utility must similarly weigh the advantages and disadvantages, he said.

Unfortunately, the engaging question of whether the actual circumstances that occur in public utility strikes legally justify both the degree and the mode of special treatment accorded public utility employees, was neither answered nor further considered. All inquiry into the question of what are the proper relative areas of collective and individual rights under our federal Constitution was from the first restricted by the presence of the Taft-Hartley Act, the Congressional enactment in the field of labor-management relations. Since the federal law was found by the U. S. Supreme Court to apply to Wisconsin's domestic public utility industries, all of the constitutional questions which the Wisconsin law provoked became unnecessary to a disposition of the case and were left unanswered.

Chief Justice Vinson wrote the opinion for the court's majority in the *Motor Coach Employees* case. After noting that Congress had expressly safeguarded the right of employees to engage in "concerted activities for the purpose of collective bargaining or other mutual aid or protection," including the right to strike, he listed the restrictions that Congress had placed on this right. Restrictions are embodied in the set of special procedures for certain strikes which create national emergencies. He alluded to the fact that companies no larger and no more important to interstate commerce than the Milwaukee gas and transit utilities long have been regarded as affecting commerce and subject to the provisions of the federal law.

The Attorney General's office of Wisconsin, in defending the statute of the state before the highest national tribunal, argued that Congress, by legislating only in regard to "national emergencies" had, by silence, intended to leave legislation on "local emergencies" to the states. In answer to this the court said:

However, the Wisconsin Act before us is not "emergency" legislation but a comprehensive code for the settlement of labor disputes between public utility employers and employees. Far from

⁸ *Wisconsin E. R. Board v. Amalgamated Association*, 257 Wis. 43.

⁹ See, for example, *Milwaukee Journal*, October 5, 1949, or *Milwaukee Sentinel*, October 6, 1949.

¹⁰ *Wisconsin E. R. Board v. Milwaukee Gas Light Co.* 258 Wis. 1.

being limited to "local emergencies," the act has been applied to disputes national in scope,¹¹ and application of the act does not require the existence of an "emergency."

At any rate, the very fact that Congress had invoked *some* restrictions on the right to strike, and not certain others, was deemed by the majority of the court to be a controlling inference in the process of determining Congressional intent. Although it may surprise many members of the 80th Congress (during the first session of which the Taft-Hartley Act was placed on the federal statute books over President Truman's veto), it was the failure earlier of the so-called Case Bill to reach final enactment after presidential veto that was considered an evidence of Congressional intent to prohibit restrictive treatment of public utility strikes by the states. In other words, the fact that greater restrictions on the right to strike were rejected by Congress, or otherwise failed to pass, was felt by the court to be an indication that such greater restrictions were to be prohibited when attempted by the states.

Instances of actual or potential conflict that existed in the concurrent administration of the federal and state laws were cited. As an example, the federal practice of continuing negotiations even during a strike is not possible where the Wisconsin law permits either side to evoke the conciliation and arbitration process as soon as negotiations reach an "impasse." Also, the state arbitrators had ruled out consideration of the question of assigning various shifts among the transit workers upon the ground that such consideration constituted an interference with management, whereas the N.L.R.B. had prior to that time continuously regarded shift assignments as a legitimate subject for collective bargaining.

In a dissenting opinion by Justice Frankfurter, in which Burton and Minton joined,

¹¹ The court here refers to the fact that the WERB had appointed conciliators to act under the Wisconsin law in regard to settlement of the Wisconsin phase of a nation-wide telephone strike. WERB decision No. 2358-c (1950).

the claim of conflict between federal and state labor legislation is answered by recitation of the rule which holds that a valid exercise by a state of its police powers should not be deemed superseded by Congressional pre-emption unless the intent of Congress to supersede state operation is clear, and unless the state and federal acts, being so directly and positively in conflict, cannot possibly be reconciled or permitted to operate concurrently. Not surprisingly, the dissenting justices did not regard the state law's repugnancy to the federal act so strong or clear as to merit a ruling that the state law was invalid. It was doubted if Congress intended to leave states "helpless in meeting local situations." The further question of whether the state law, if not in conflict with the federal, is in fact a valid exercise of the state's police powers, would presumably open that wide vista of legal problems that are pertinent to the concepts of substantive due process and equal protection.

Meanwhile, the immediate question pertains to what regulation of public utility strikes by states, if any, is permissible. If one reads Chief Justice Vinson's opinion literally, it is the necessary conclusion that *any* state restriction on the right to strike beyond the restrictions provided in the Taft-Hartley Act for national emergencies would be regarded as repugnant to what Congress intended. This leaves unanswered the question of whether a state could delay, not prohibit, a strike if the strike in fact involved a local emergency. Despite the *Motor Coach Employees* case, it seems inconceivable that the state could not act where a hazard to the public health or safety were present.

The constitutional questions under the Fourteenth Amendment that were left unanswered by the decision are of course irrelevant so long as the Taft-Hartley Act exists in substantially its present form.

ROGER S. BESSEY

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¹ See
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Book Reviews



Ten Rivers in America's Future. The Report of the President's Water Resources Policy Commission, Vol. 2. Washington, D.C.: Government Printing Office, 1950. pp. 801. \$6.00.

Even at six dollars, Volume 2 is a better buy for land economists, engineers, geographers, or those who wish to compare other basins with the one upon whose development they are at work, than Volume 1 (the formal report of the President's Water Resources Policy Commission).¹ This second volume contains the equivalent of a short book (illustrated with one or two maps) on each of the ten river basin developments: the Columbia, Central Valley of California, Missouri, Colorado, Rio Grande, Connecticut, Alabama-Coosa, Potomac, Ohio, and Tennessee. (The St. Lawrence is excluded; even last summer it was not entirely clear that it would again appear so high on the agenda of policy makers.) These are working papers, not designed to captivate the general reader. But nowhere else since the National Resources Committee published its Drainage Basin Committee Reports fourteen years ago has information been published permitting a comparative view of the major basin developments.

Geographer Edward A. Ackerman (University of Chicago) chaired the committees which last summer planned and reviewed seven of the studies; Walter C. Lowdermilk was responsible for three. Following the National Resources Committee pattern these committees enlisted a dozen or more members from the staffs of the federal agencies which have water conservation responsibilities. Even more than in the '30's, the facts available inside the agencies are indispensable, for many of these basins have already been importantly changed by existing federal

programs. These were not in the main people from the basins involved and, unlike the NRC Drainage Basin Committees, included no state or university people or consulting engineers from the basins. Perhaps partly because it is to this degree self-examination, *Ten Rivers in America's Future* has some platitudinous conclusions. "The main objective, namely the greatest public good, should be kept constantly in mind and in the forefront of comprehensive plans." Some paragraphs were written in "federalese."

All the more to the Commission's credit, then, is the emphasis in each basin study upon the chapter headed "Policy Problems and Their Relation to Plans for Development." Here are faced such issues as salmon spawning v. high dams on the Columbia; acreage limitation and public v. private construction of multipurpose power dams in the Central Valley; navigation v. irrigation and other consumptive uses of water of the Missouri River; redistribution of Rio Grande water rights; claims upon the water of the Colorado by upstream v. downstream users and California v. Arizona; livestock interests v. conservation of the watershed in the Colorado basin; opposition in the upper Connecticut valley to inundation of scarce farm land for storage of downstream floods; high dams v. low on the Ohio and the Cumberland. Especially does the Colorado study get to the core of these policy issues. Note that for most of these problems opposing interests, sectional and economic, have developed the arguments. The studies also examine those issues in all basins where jurisdictional disputes among the development agencies highlight policy questions: irrigation as an agricultural problem, low navigation dams v. power capacity, power v. recreation. On the other hand flood plain zoning, while regularly considered, is not considered in costwise comparison with storage and levees. Agency navigation forecasts are not tested, nor are the long-term project cost estimates upon which economic appraisal depends (a Hoover Commission task force found fault with the latter).

¹See page 169, this issue of *Land Economics* for a commentary on Volume 1 by Martin G. Glaeser; and page 76, February 1951 issue, *Land Economics*, for further comments by Raymond J. Penn.

Some readers may be disappointed that on so many of the controversial policy questions the studies conclude merely that Congress or the basin public should make a choice between the alternatives presented. But these questions are proper grist for the political mill. This being true, histories of the attempts at political and legislative resolution might have been as relevant to the other basin studies as they are in the case of the Colorado and Tennessee. But more discouraging is the repeated conclusion of the commission staff upon a policy problem that "a study should be undertaken to explore the consequences of alternative plans." After authorization or even construction of projects, the controlled data necessary for the interested publics and Congress to define programs remains unavailable. It is not available concerning the physical potential, nor the full cost of the proposed development works, much less for their economic or social consequences. Precisely here the study of the Tennessee Valley provides dramatic relief. For this basin alone can one tell what has been spent for each purpose and get at least crude measures of results. Hence the study's conclusions to the fewer policy issues encountered in this basin appear, without always endorsing the TVA position, comparatively clear-cut and definite.

The President instructed his Commission to steer clear of questions of administration of water resources. But it is clear from these ten basin studies why the Commission was driven to conclude that difficult policy questions of the type raised by water conservation in all its ramifications scarcely present themselves for solution except as they are presented by concerted staff work of a type too continuous and elaborate and too responsive to the climate of public consent to lie within the power of a national ad hoc commission. It is the country's misfortune that work of the Hoover Commission on *administration* of water resources was not concurrent with these studies of *policy*. Each commission was irresistibly enticed by the interdependence of these questions to make proposals in the other's field, but lacking jurisdiction to extend its studies equally far, had to make these proposals off the cuff.

HENRY C. HART

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Rural Cuba. By Lowry Nelson. Minneapolis: University of Minnesota Press, 1950. pp. 285. \$3.50.

Rural Cuba, in the modest words of its author, is an *introduction* to the study of Cuban society. As such, it accomplishes the stated intent. Moreover, it epitomizes in a systematic and professional manner the socioeconomic aspects of Cuban rural life. It is based upon a sociological study conducted by the author during the year, 1945-1946, under the United States Departments of State and Agriculture in cooperation with the Cuban government. It draws upon materials from the Cuban census, special surveys, pertinent literature and personal observations of the author.

Cautious in making generalizations, the author's implied scheme is to convey his ideas through well-organized facts and figures which might be somewhat tedious for the casual reader but intensely interesting to one inspired with a desire for detailed information about Hispanic America. The major statistical device is the comparison table in which relationships between the various social and economic factors are discovered and presented. The first part of the book, however, is a striking, descriptive panorama of the land resources, the growth and composition of the population, the climatical and economic seasons, locality groups, types of farming, and of the evolution of the Cuban land system. The latter, previously published in *Land Economics* (November 1949), follows the development of the contemporary agrarian pattern through six major stages since the discovery of America. Such rigid compartmentalizing by periods may be somewhat unfortunate.

"The present organization of sugar production," according to the author, "has its roots in the latifundium of slavery days . . ." But the sugar latifundia, as they were said by the author to have developed after 1900, "were fashioned in the social and economic matrix of the twenty-five-year period from 1870-1895."

Sugar interests in 1946 controlled almost a third of the land area. But sugar was produced on only 47,028 of the 160,000 farms of Cuba and was the principal source of income on only 29,121. But 70 percent of these farms produced only 10 percent of the total

output. The remaining 90 percent is under control of the *central*, the large-scale sugar mill. In 1925 and 1926, 20 percent of the total area of Cuba is said to have been owned by these *centrales*.

The primary message of Lowry Nelson's book, however, is not one concerning the sugar industry itself. On the contrary it concerns the pattern and condition of rural society which has evolved along with the sugar industry and other types of farming, such as coffee, tobacco, and livestock—each with its own type of tenure, size of holding and organization, and each with its own type of impact upon society.

Cuba, according to the author in a moment of relaxation from his usual cautiousness, "is one of the most favorable spots for human existence on the earth's surface." Yet, here subsists a rural population, 45 percent of the total (1943), characterized by its "comparatively low standard of living, lack of educational opportunities and in relative social isolation." Class distinction is a survival of the feudal structure which characterized Spain at the time of Cuba's settlement and of the "master and slave tradition, where skin color became an identifying badge of servitude."

DAVID WEEKS

University of California



Commercial Motor Transportation. By Charles A. Taff. Chicago: Richard D. Irwin, Inc., 1950. pp. x, 413. College \$5.00. Trade \$6.00.

The growth of motor transportation in the United States has been one of the most significant economic developments of the past half century. Its phenomenal growth is continuing in the field of both passenger and freight transportation by bus and truck. In spite of its rapid expansion, relatively recent federal and state regulations, and many "growing pain" problems, the motor carrier industry has achieved a considerable degree of stability and no small degree of economic importance. It is not surprising therefore that Professor Taff has been encouraged to write this book. *Commercial Motor Transportation* attempts to meet a need in both the textbook and trade areas by pro-

viding, according to the author, "a broad picture of the industry and by assembling and analyzing all the pertinent factual information in this vitally important field." He does this task very well indeed. Part I, covering about 50 pages, outlines the scope of the highway and motor transportation systems in the United States covering such topics as the sources of highway revenues, methods of highway financing, and federal aid. Part II, covering about 275 pages, deals with the motor freight transportation activities. Included in this section are items such as equipment purchase, terminal operations, insurance, regulations, over-the-road operations, and rate making. The final section of about 50 pages analyzes the problems and operations of motor transportation of passengers. At the end of each chapter is a list of questions and problems. A bibliography is included at the end of the book and the text is well documented. The index would be more useful if not quite so abbreviated. Statistical tables and illustrations are well-chosen.

As a basic textbook for a one-semester course, *Commercial Motor Transportation* deserves a wide use. It builds on the previous books of Wilson, Edwards, and Stocker, and, in addition, has drawn on the extensive experience of the past decade since the last book in the field of motor traffic management was published. The material is clearly written, well-organized, and presented with an emphasis on the practical side of motor transportation.

Much of the text material is descriptive rather than a discussion of the pros and cons of the many economic problems in the industry. Assuming that the teacher is qualified to and does pick up the ever-present current problems as a part of the class work, the emphasis upon description in a beginning textbook is not objectionable to this reviewer.

As a book for the management of motor carrier concerns, it has much practical value. While not designed as a handbook, much useful information of that type is available in the book, enough so that almost any management could find some help from the book.

LESLIE A. BRYAN

University of Illinois,
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The Impact of Government on Real Estate Finance in the United States. By Miles L. Colean. New York: National Bureau of Economic Research, 1950. pp. 171. \$2.50.

The field of real estate finance has always been notoriously arid in its supply of descriptive and analytical materials. It is therefore with sensations approaching those of the thirst-parched wanderer upon the desert plain who encounters a small but lush oasis that the professional and academic reader will react to Mr. Colean's competent monograph. This book is the second in a series of studies being prepared under the Urban Real Estate Finance Project of the Financial Research Program which is being carried on by the National Bureau of Economic Research.

To many, the title of the monograph may immediately suggest a discussion of federal agencies involved in some phase of real estate credit activity. This first impression is not entirely erroneous since the primary concern of the study is with real estate credit conditions and influences, mainly governmental, which developed in this country during the 1930's and 1940's. However, this concern is but the focus of a much broader background which sketches in a masterful compendium the historical roots (philosophic, economic, and political) of those dramatic changes which took place in the field of real estate credit over the past twenty years.

Further perspective on governmental influence is given by the inclusion of meaty chapters on regulation of institutions financing real estate, land use regulation, financing methods and instruments, and the indirect impacts of government. This last includes many significant observations on the relation of the property tax, the income tax, and tax exemption to the problem of attracting investment capital into real estate.

The proliferation of government controls familiar to all in the present era is seen by Mr. Colean to be more pronounced in the field of real estate than in "... any part of the economy not distinctly of a public or public utility character." He feels that, whereas prior to the thirties the aim of government was to promote and "... encourage real estate as a form of enterprise," there has now developed the aim of protecting the welfare of the individual. The power of the

federal government to push toward this objective in the field of real estate is implemented by broad interpretations of the monetary power delegated by the Constitution. This situation has given a unique twist to investment theory in that government now encourages the extension of credit on the basis of need rather than risk and adjusts the terms of credit to meet the need.

In the author's opinion, the pattern of governmental influence is interwoven with discordant threads of conflict. These conflicts are found, for example, in a tax policy at odds with measures to encourage equity investment in income-producing property and in the heavy extension of credit for new homes in a period of demoralizing inflation.

This monograph serves as an admirable outline and organization of ideas on what is undoubtedly the most challenging phase in the development of real estate finance in the United States. While many of its conclusions are open to question they are, at the same time, stimulating and should serve as a spring-board to further research and discussion, an objective adequately enabled by extensive well selected references.

RICHARD B. ANDREWS

University of Wisconsin



The Rural Economy of New England, A Regional Study. By John D. Black. Cambridge: Harvard University Press, 1950, pp. 789. \$7.50. College \$5.75.

The primary purpose of this book is to analyze the rural economy of New England. Dr. Black visualizes that this book will serve certain New England groups—teachers and students of agriculture, forestry and land use, public servants, cooperative leaders, and business leaders. He also visualizes use of the volume outside New England by similar groups and particularly by regional planners in "discovering the kinds of analysis that are basic to useful planning." This reviewer is uncertain as to how widely this volume can be used by these groups.

The book presents a *regional study* of rural New England and, as Dr. Black points out, the subject is approached from the open country looking toward the city and not from the city. It is not a planning study. It presents the basic background information

on resources, needs, and possibilities with which any planner should become acquainted before undertaking any actual planning activities. So far as subject matter is concerned, the coverage is adequate.

In analyzing the rural economy of New England, Dr. Black approaches the subject from two angles, (1) from type-of-farming enterprises and associated problems, and (2) from broad over-all problems. The latter approach gives the reader a clearer picture of problems as they affect the total region.

A reader, in examining this volume, is likely to ask one question many times, "What is the situation today?" Even though the reviewer is aware of the quirks in the various censuses and the reader is frequently warned of them, that question inadvertently arises. Most readers will be puzzled as to why a book published in 1950 leans so heavily on data two decades old. For example, a dot map shows farm population and a second map shows distribution of milk cows per 1000 acres of land in farms. The former is dated 1920 and the latter 1925. Reference to old censuses or to research findings made some years in the past is sound, but dependence upon them appears to be too great.

The chapter on income does an excellent job in bringing the reader up to date. In this chapter a number of modal-type farms are examined, and changes in farm enterprises and income from 1921 to 1947 are analyzed. The data on the modal-type farms are more meaningful than the usual data based upon regional or subarea averages. These analyses of modal-type farms give the reader a far better picture of what the situation is today than any other discussion in the book. To the regional planner this is extremely important. He is concerned with the present situation and also with what has taken place in the past as a basis for understanding the present situation better.

In the last chapter, "Regional Policy and Program," Dr. Black emphasizes the need for an integrated rural program, starting at the town level and working up, and he summarizes the major problems that must be considered if New England is to have a sound rural economy.

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Conservation of Natural Resources. Edited by Guy-Harold Smith. New York: John Wiley & Sons, Inc., 1950. pp. 552. \$6.00.

This volume is the successor to *Our Natural Resources and Their Conservation*, edited by A. E. Parkins and J. R. Whitaker and originally published in 1936. Of the twenty contributors to the new book, ten were represented by chapters in the earlier publication. While most of the chapters have been rewritten, the general organization and the character of the volume as a whole have been little changed. The book is designed primarily for college students, and the editor expresses the "hope that we have brought together in one volume the many facts and ideas in the broad and diverse field of conservation . . ."

Facts and ideas are packed closely in this comprehensive symposium, which embraces twenty-three chapters on the following topics: the development of conservation, the public domain and its disposal, the great soil groups and their utilization, soil conservation, tree crops, irrigation, grasslands, reclamation of wet and overflow lands, agriculture, forest resources and forest conservation, water supply, water power, waterways, flood control, minerals and mineral fuels, wildlife, fisheries, recreational resources, the conservation of man, state and local planning, and national planning and the conservation of resources.

Clearly, however, there are many other ideas and facts that might have been presented and evaluated. The book reflects the geographers' tendency to set forth "the situation" with decidedly secondary attention to stating "problems" and analyzing proposed alternatives for action. Economic and governmental policy issues are not tackled in the manner usually employed by economists and political scientists, and many of the chapters seem to miss coming effectively to grips with the real "how?" questions. So far as the reviewer could discover, there is no reference to the significant reports and recommendations of the Hoover Commission concerning natural resources; and with respect to some topics (e.g., regional planning), the discussions seem not much influenced by the literature of the last ten years.

Nevertheless, considered as an introductory textbook in a difficult and sprawling "field," the work is commendable and will no doubt be widely used. When better introductions to "the conservation of natural resources" are written, it is likely that economists and students of government will have a somewhat larger share in the task.

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Planning Micronesia's Future. Edited by Douglas L. Oliver. Cambridge: Harvard University Press, 1951, pp. 94. \$3.50.

Micronesia—comprising the Marshall, Caroline and Mariana Islands—has a population of 73,000 natives inhabiting a few of the more than 2,000 islets, islands and atolls which are spread over an oceanic area larger than the land area of the United States. The land area of these islands is less than a thousand square miles. During and immediately after World War II, the inhabited islands were devastated by invasion, bombing, strafing and occupation, and the economic basis for survival was largely destroyed. The United States, at first by occupation and later by trust of the United Nations, has administered these islands through Naval Military Government.

This report, based on studies made during 1946 when most of the problems of rehabilitation and development remained unresolved, is a summary of a number of individual studies made by specialists from universities, government agencies, and the United States Commercial Company. The report consists of four chapters dealing respectively with geographic and human settings, basic needs and resources, income, and institutional

needs, and a fifth chapter in the form of a one-page conclusion.

There is agreement among the collaborators that a minimum goal of rehabilitation would be the restoration of a standard of life as high as that prevailing under Japanese occupation. It is also clear that such a standard could not be achieved or maintained without considerable financial assistance from the United States. The government has the moral obligation of underwriting the procurement and distribution of large amounts of capital goods, and both durable and non-durable consumers' goods.

Some part of the redevelopment cost could be underwritten by the natives themselves if immediate settlement of their claims against the Japanese and the United States could be accomplished, and if the various yen holdings of the natives could be converted into dollars at a more realistic ratio of exchange. Other important requirements are a cadastral survey, the restoration of both inland and water transportation, the equipment of fishing fleets, processing plants for copra and fish drying, public utilities, sanitation and medical facilities, mining equipment, handicraft tools, housing materials and supplies, and livestock and poultry. A major problem is that of finding markets for the exportable products of these islands whose prewar trade was composed largely of exports to Japan and the eastern coast of Asia, and whose imports came largely from Japan.

The United States has fortunately adopted the philosophy that the natives should be permitted to develop their own economy with a minimum of interference. This they can do if given sufficient material assistance at the start. We should expect to do this much and possibly more for peoples and lands which have been entrusted to our care.

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